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Chicago, January 10, 1925 (*Issued Every Other Week*) Volume XXVIII, No. 1

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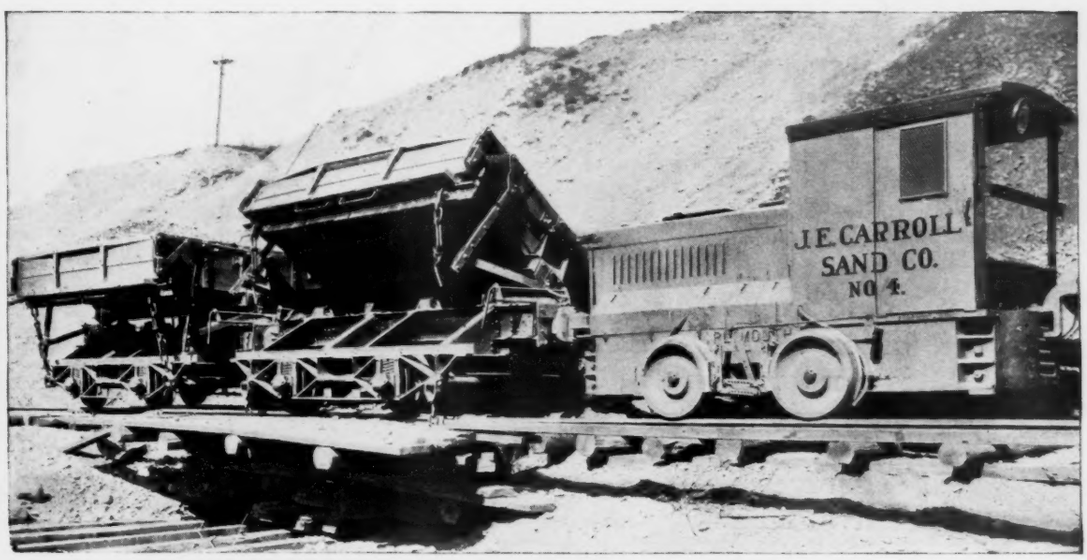

J. E. Carroll Sand Co. Chooses Plymouths for New Plant

The J. E. Carroll Sand Co. of Buffalo have just completed a big, new sand and gravel plant at Franklinville, N. Y. The plant and equipment are the last word in efficiency, and naturally Plymouth Locomotives were chosen to assume the haulage burden.

When a man buys, tries, repeats and recommends, his endorsement has WEIGHT. It can not be ignored or passed up as of no moment.

Read Mr. Carroll's letter—then write for Bulletins "C" and "F".

THE FATE-ROOT-HEATH COMPANY
Plymouth Locomotive Works
PLYMOUTH, OHIO

J. E. CARROLL SAND CO.
Buffalo, N. Y., Oct. 18, 1924.

The Fate-Root-Heath Co.,
Plymouth, Ohio.
Gentlemen:

We have been users of Plymouth Gasoline Locomotives for the past eight years. They have given such good satisfaction that when we built our new Franklinville plant our first choice was naturally the Plymouth.

Our men at the plant will always use the Plymouth in preference to another make we have had in use. That I consider the highest recommendation that can be given to anyone.

Yours very truly,
J. E. CARROLL SAND CO.
Per J. E. Carroll.

PLYMOUTH
Gasoline Locomotives

MEMBER A.B.C. *The Only Paid Circulation in this Industry* MEMBER A.B.P.

Next Issue will Be January 24

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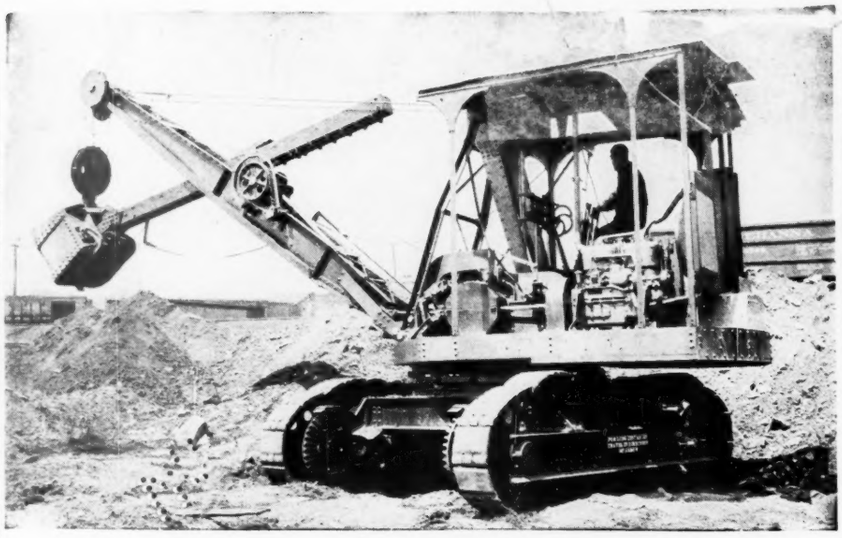

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Vol. XXVIII | Chicago, January 10, 1925 | Number 1

Sand and Gravel Men Hold Their Ninth Annual Convention

Adopt a Program of Vigorous Educational and Promotional Work

THE Ninth—or Thirteenth, if you like—Annual Convention of the National Sand and Gravel Association finished its labors—and pleasures—at noon, January 7.

Of course it was the biggest convention yet held, for the organization has grown with the industry. But it was also the most important convention yet held since the first meeting of a few producers who gathered around a table in a room in the Auditorium hotel in Chicago in 1911, the same room in which the directors met on January 5, 1925, to review the work of the association and to map out its work in the future.

The reason why this convention is so much more important than those which have preceded it is that the association has at last reached a position, financial and otherwise, from which it can not only carry on the work of service to individual producers in which it has been so successful but it can begin a vigorous campaign for educational and promotional work. Sand and gravel has been a sort of Cinderella among the rock products industries. To the man in the street, sand and gravel was something you dug out of a hillside at a dime a cartload and then spread on a road. Even architects and engineers did not fully appreciate that the modern sand and gravel plant turns out a manufactured product, carefully washed and graded to meet specifications that are growing more rigid every season. They cannot yet appreciate the care and trouble required to make special gradings and they do not know that the up-to-date producer of aggregate is as jealous of the reputation of his product as an automobile maker.

All this is to be changed in the future. The National Sand and Gravel Association has done a notable amount of work already in raising the public opinion of its product, especially the opinion of that part of the public which is directly a user of its product. But this has been something of a minor activity. In the coming year, if the plans of the association are carried out, it will be a major activity to be forwarded through the use of technical publications, associations of engineers and architects and the various bodies that are promoting the construction of better roads.

John Prince re-elected president of the National Sand and Gravel Association

A quite extensive program of activities was adopted, the first section of which dealt with educational and promotional work. The *Bulletin* is to be enlarged in order to advance such promotional work. Other sections dealt with the indorsement of the Kelley tariff, with workingmen's compensation insurance, and with association dues, which are not to be changed. Local associations are to be encouraged. An important feature of the program was that of holding regular bi-monthly meetings of the executive committee in various parts of the United States. These meetings will not only be for the discussion of the work of the association, but also for getting in touch with producers in the locality in which such meetings are held.

The meetings of the convention heard some excellent papers by outside speakers. Perhaps their best feature was the discussion of problems of the industry by the members themselves. These discussions were opened either by a brief paper or a short talk by the member who had called for a discussion of the subject while the program was being made up.

Directors' Meeting

IT is the custom of the members of the board of directors of the association to meet yearly the day before the convention

opens in order that the nominating committee and the committee on activities for the coming year may be appointed and learn the opinions of the other members of the executive committee before their

Hugh Haddow, Jr., elected vice-president

reports are prepared to be submitted to the convention.

This meeting was held this year in the same room in the Auditorium Hotel in which a few producers gathered in 1911 to form an organization, at a time when the sand and gravel industry itself was hardly more than an infant. Some of the men who attended that first meeting were present as members of the executive committee, a fact to which President Prince called attention when he opened the meeting.

The president reveiwed briefly what the history of the association had been and why it had seemed necessary for it to take upon itself the work that had been done. But now that the time for such work (in connection with freight rates, car shortages and the like) had been systematized and organized, he felt it was the duty of the association to enter on a new period of activity and to devote its attention to educational and technical work. He wanted to hear from the members of the committee as to how they felt on these matters.

Alex W. Dann moved the appointing of a committee to consider these activities and the president appointed Messrs. Haddow, Shiely, Donnelley, Sutton and Smith, and on another part of the same motion appointed Messrs. Dann, Burke and Rogers as a nominating committee. The nominating committee went into executive session but further discussion of activities.

Executive Secretary Barrows was asked to read his annual report which had already been published as a part of the convention program. The following paragraphs taken from this report show the work accomplished in 1924:

"During the past year the National Association, on more than 140 occasions, rendered to members specific service of definite and concrete value.

"In more than one instance, the value of the specific service so rendered exceeded that member's dues for the remainder of his business life. Members have expressed themselves to that effect.

"While this special privilege of membership in the National Association is now taken for granted, the protection of the

J. L. Shiely, re-elected secretary-treasurer

individual member during 1924 has been but incidental to the general and more important activities of the National Association. These activities, designed to promote the welfare of all established sand and gravel producers, included:

"Extending and promoting the use of properly prepared sand and gravel, including three important instances of effective opposition to use of wayside pit materials by federal and state governments.

"Extending the use of gravel in Federal-aid highway specifications.

"Demonstrating the suitability of washed gravel as railroad ballast.

"Maintaining membership in, and representation before, the American Society for Testing Materials.

"Representation of the sand and gravel industry before all departments of the government, and development of working relations with other national organizations of the building industry.

"Research work at the request of different agencies of the government engaged in special work affecting the sand and gravel industry, such as the Plastering Conference of the Bureau of Standards, the Winter Construction Investigation of the Department of Commerce, the Uniform Building Code Committee of the Department of Commerce, the Federal Specifications Board, and others. Through the recommendations of the National Association to these bodies, the interests of the established and responsible producers of sand and gravel have been protected."

As to recommendations for the future, the report said in part:

"Scientific research, vigorous and systematic promotional work, now possible as direct results of the continued growth of the National Association, are commended by the executive secretary as the principal activities of the organization for the year 1925. This, of course, in addition to the incidental, but always valuable, specific service available to members and which covers practically every phase of their business, as so forcibly illustrated by the files in the Washington Office."

J. H. Shiely gave a brief summary of the treasurer's report which showed the excellent condition of the association which is now entirely free from debt with all current bills paid and a surplus of about $4,000. Dues are being paid promptly and

T. R. Barrows, executive secretary

the prospects are for sufficient funds to carry out the new program.

The committee adjourned until the following morning when it met to receive the reports of the nominating and activities committees and to continue the discussion. The reports will be found in the activities committee remained for

the record of the last session of the convention.

W. E. Clarke of the Clarke Rock and Gravel Co., of Los Angeles, appeared before the committee and gave a talk on conditions on the coast. It appears that a state association is needed there and the producers would be glad of some help in forming one.

There was some talk as to reduction of dues as a business proposition, but it seemed to be the opinion of most of the members of the committee that the dues should not be changed.

Opening Session

THE convention broke a record in assembling so that it could be called to order promptly at 10 o'clock. The president introduced John Sloan, president of the Board of Local Improvements of Chicago, who welcomed the delegates to the city. In introducing him, President Prince said it was fitting that Mr. Sloan had been chosen to do this, as in his work he constantly came in touch with producers and understood their problems. Also he had been a producer himself of both sand and gravel and crushed stone.

Address of Welcome by John Sloan

Mr. Sloan said that he was present at the request of Mayor Dever, who would have spoken to the delegates in person if he had not been called away to New York. He wanted the delegates to know that if there was anything the city could do to make their stay more pleasant and profitable they had only to make it known and the city would be glad to do it.

Chicago, besides being the greatest grain, cattle and furniture market, "among other greatest things," is probably the world's greatest sand and gravel market, since the yearly consumption amounts to 5,500,000 tons. And this market is not only for today but one that ought to and will continue to increase.

There is no such center of gravel deposits elsewhere. The glaciers pushed mountains of material before them and the kames and eskers which are now worked for sand and gravel on all sides of the city show something of what was left. Geologists have shown that at one time there must have been an ice cap two miles high pushing before it a long ridge which now at Summit is 160 ft. above the level of the plain. It would almost seem as if the Green Bay glacier and the Chicago glacier had the judgment to see that a great city would sometime arise at this place and that the sand and gravel they brought with them would be needed.

Chicago is the center of a district 1000 miles square, the soil of which was prepared for human habitation by these great glaciers, and this district is capable of supplying practically all human needs. There are great deposits of iron, copper, lead and zinc, in addition to the fine agricultural land and the timber resources which it has had and can have again. The climate and rainfall are a guarantee against famine and drouth. Chicago is the great distributing center of America. Within a night's ride on the train live 40,000,000 people.

Today Chicago is spending $600,000,000 in building and there are 180 miles of streets and 60 miles of alleys to be paved, for which contracts have already been let.

In closing, Mr. Sloan wished the association all success and hoped that the deliberations of the convention and the work of its officers and directors would lead to higher standards both in the industry and the material produced.

Frank Renwick

Frank Renwick Tells of the First National Convention

Frank Renwick, president of the Chicago Gravel Co., and a member of the association from the first, followed Mr. Sloan. In introducing Mr. Renwick the president spoke of how fitting it was that Mr. Renwick should be present to attend this convention since it was he who was chosen president of that first association formed back in 1911.

Mr. Renwick, who has done perhaps as much as anyone for the growth and importance of the sand and gravel industry, spoke of the satisfaction with which he looked over the well-filled room and compared it with the small number who had assembled in 1911 at the same hotel to form an association. There were perhaps a half-dozen present whom he could recognize and remember as having been at the earlier meeting. There wasn't so very much of a sand and gravel industry anyway at that time, but the association had started off in a blaze of glory from the papers and especially from Rock Products. Rock Products had changed considerably from what it was in those early days. "Now we read it as we do our bibles, and sometimes before," said Mr. Renwick.

Mr. Renwick thought that the association had done wisely in coming to Chicago, and in closing he paid a well deserved tribute to John Sloan, the previous speaker, for his work in the city. He hoped and believed that the National Association would continue to grow as it had grown and assured it of his continued interest and affection.

President Prince then exhibited the file of Rock Products to which contained the report of the first meeting to which Mr. Renwick had referred and made the following address:

President Prince's Address

THIS has been advertised as the Ninth Convention of the National Sand and Gravel Association, and in fact the National Association has been in continuous existence and annually held a convention, beginning with the one held in this hotel, February 14 and 15, 1917. This, however, was not the first meeting of the association.

I want to discuss with you briefly today the direction of progress the National Sand and Gravel Association is taking and should take in the future. In order to do this I want to review briefly the history of the association to date and the factors that have been prominent in carrying it along the lines it has traveled.

As a matter of fact an organization meeting of the National Association of Sand and Gravel Producers was held in this hotel in December, 1911. It appears that our own member, Frank Renwick, then and now president of the Chicago Gravel Co., had a neighbor, Edgar Defebaugh, who in 1911 was editor of Rock Products. These two men had considerable discussion concerning the state of the industry and what might be done to improve the conditions existing among producers of sand and gravel. This resulted in a meeting in 1911 called by Mr. Defebaugh, which was in fact the first attempt to organize the sand and gravel producers on a national basis. The association then formed elected Mr. Renwick president and among the officers we find names of several who are still members of this association, including Mr. Halliday of Cairo, Ill., Lee Witty of Terre Haute, Ind. and Ted McGrath of Lincoln, Ill. Mr. Renwick tells me that it was not a large organization, consisting principally of members in and about Chicago, that they had no money and depended largely on

Rock Products to furnish the secretarial ability and paid assistance that is so necessary.

Another meeting was held the following year, but it appears the time was not ripe for the successful organization of a sand and gravel association on a national basis. Mr. Defebaugh was not, however, discouraged, as shown by the minutes of our association covering the meeting held here in 1917. "Upon invitation of E. H. Defebaugh of Rock Products, a number of producers met at the Auditorium Hotel, Chicago at 11 o'clock." Later, Mr. Defebaugh severed his relations with Rock Products and his work with that magazine was taken up and has since been continued by Nathan Rockwood, whom we all know. Mr. Defebaugh died recently and cannot now see the association in its present position and appreciate the growth and sturdy condition of the "child of his imagination."

The list of those present at the meeting held in 1917 contains many familiar names, names of those who are still with us and taking an active part in the present organization.

It will be noted that the revival of the association which occurred in 1917 was coincident with the entry of this country into the war. In fact, in reading the minutes of the early meetings, it would appear that the need of co-operation in dealing with car shortage due to the war was the primary cause of the meeting for self defense. The association was then and for some time afterward largely fostered by the Indiana association, and it is doubtful if it could have passed through the trying times that followed without the support of the Indiana association. At this meeting Guy Sutton became secretary and continued in that capacity until the convention in New Orleans in 1922. At that time, at his own request, he was relieved and our present executive secretary took charge of the work.

After-War Transportation Conditions

Considering the condition surrounding the organization and that tremendous dislocation of all industries due to the war, and considering the threat against the continuance of business, particularly of those members who were removed from the seaboard it is but natural that the activities of the association should have centered in and been largely confined to the problems connected with railroad transportation. It was first the question of car supply and that question continued for some years; in fact, it has been only during the past year that car supply has ceased to be of outstanding importance to producers depending on railroad transportation.

When the movement to increase rates started, it found the railroads suffering under years of regulation without assistance, suffering under rates built up through years of highly competitive operation, and found them in no position to meet the capital expenditures necessary, and the expansion in operation required by the emergency of war. The increase in rates put into effect, startling to producers who depended on railroad transportation, reached a point where many of us believed the continuance of such rates would entirely put us out of business. It was but natural that the activities of the association should turn to the fight on railroad rates. It was not until the present time that some of us could see that the increased rates, disastrous as they were to a few, and a hardship to all, were but the necessary outgrowth of the economic situation. It was difficult for us to realize at that time that rates were not in fact a national issue, but were of necessity a local issue to be handled successfully only by the individual producer negotiating with the railroads serving him.

Why the Association Went Into Debt

To carry on a national effort to reduce rates and to prevent further increases required financial ability beyond the resources of the association as it then existed, with the result that the association went into debt. For the past three or four years we have struggled with this debt until today, when Mr. Shiely will report to you that through the able and economical management of our secretary, Mr. Barrows, we are now entirely out of debt and have a cash surplus.

We have as an association, passed through the crisis of the war and have, I believe, passed through the painful but necessary period of reconstruction. As an association we have paid for our part in the war and during the past year have been faced with other groups of problems which have begun to point out to us the way for our future progress and the direction of growth which the association will now follow.

During the period I have just described, difficulties were faced and no doubt mistakes were made. A large group of producers along the seaboard, who were not concerned with freight rates, felt that the National Association was merely an organization to fight the railroads. Naturally they saw no reason to join us.

Efforts Not Wasted

But all of these efforts were not wasted. The direct results may have been of no consequence but indirectly they brought the industry as a national organization prominently before many branches of government in Washington, before the railroad organization and before the public to an extent that makes much easier the accomplishment of our present and future obligation. We are recognized by all as an industry of fundamental importance and as an aggressive National Association.

Now we are faced with the problems of developing the industry and of securing more intelligent use of our material. We must justify the tremendous investments that have been built up in the industry to provide aggregate of high class and uniform quality to meet the specifications which have developed during the past few years.

Two Kinds of Association Activities

There are two groups of activities which the needs of the members have developed and which the association should continue. One is the personal service rendered by the organization in the Washington office to which a startling array of successful accomplishments can be credited. These have to do with the many individual problems of producers and bring our organization into contact with practically every department in Washington. Only those companies who have made use of this opportunity realize the advantage of the service rendered. A large percentage of our members who do appreciate this service and have made use of it, know fully the thorough way in which Messrs. Barrows, Ahearn and the other members of the organization carry out the commissions given them. The value of this service is very great and the Washington office has many testimonials from members setting forth this value.

The second group of activities concerns the industry as a whole and includes those which only an organization of this kind can carry out. These are sometimes called promotional activities although the name is not a good one. Most of the important industries have such organizations and many of them have been of tremendous influence for the good of their industry. The Portland Cement Association, with which you are all familiar, seems to me to offer a splendid illustration of the course our association should follow from now on. The cement association functions largely to increase the use of the product of that industry, but with that goes the constant effort to build up the intelligent and economical use of portland cement to the end that the customers of their members may carry on their construction work with the least expense possible. Many times the activities of the Portland Cement Association could seem to curtail rather than to increase the use of its product, by finding ways by which more economical construction work can be carried on. You will readily see, however, that this is only apparent and that in the end the industry benefits through such a course.

Sand and Gravel Developed to a Large Industry

In the use of sand and gravel we have developed an industry in a surprisingly short time to a point where it is one of the largest industries in the country. Are

our customers using our product intelligently, or are they still using the materials we produce on the basis of any old sand or any old gravel, in spite of the specifications we have to meet and in spite of the extra cost of producing a high-class product? It is now up to this industry through this National Association to so educate the users of our materials that they will benefit from our high-class products and will learn that they cannot afford to use unprepared materials.

Educational Work

We should carry on this work through the preparation of numerous articles—technical, educational, and descriptive. We should secure the continuous publication of these in the many magazines and periodicals that will reach the users of sand and gravel.

We should proceed in the preparation of a film for general use by the membership showing the origin, preparation, and use of properly prepared sand and gravel for the various purposes for which it is intended.

There is, and through the nature of things there should be, a wide variation in the specifications for our materials. We should have the resources of a competent technical department which can aid in the preparation of the best specifications to meet the different conditions in the different sections. These specifications should read not only to admit the materials available, but should require the materials found to be most efficient under the circumstances. These would consider the complete cost of the aggregate, including waste as against the economy to the user.

Our members should be assisted through the combined experience of the industry to meet their requirements in the most effective way.

An Engineering Department

Our engineering department should follow the research work of other agencies to insure the fair and representative treatment of our product. I have in mind here the investigation of the fire-resisting qualities of concrete in which I understand results unfavorable to gravel were developed. These were unfavorable, no doubt, due to the fact that the gravel chosen was not representative. It is essential to our industry that such results be anticipated and damage to the industry due to such incomplete, though well intended, reports be avoided.

I do not doubt that as time passes we shall grow to such strength that we can conduct our own research work either in our own laboratory or by working with other agencies.

Continued study should be available to us from a national viewpoint looking toward the development of uses and markets for the by-products in our several operations, for it is by so doing that the average selling price can be reduced without danger to the producer and the recognized economic requirement of reducing cost be met.

I believe we should look, not so very far ahead, to the time when our association may embark upon a national advertising campaign of education.

The large majority of the users of sand and gravel are not as yet well enough informed to get the full benefit from our materials and do not yet appreciate fully the advantages to be gained in buying only properly prepared materials such as preeminently the members of this association have to offer.

In accomplishing these larger promotional activities and those that must be developed in the future, this association will be a necessary part of the business life of all producers, east and west, on the seaboards and of the great inland plain.

Treasurer's Report

In presenting the treasurer's annual report, J. L. Shiely (J. L. Sheily, St. Paul, Minn.) spoke of the success the association had enjoyed during the past year and said that the measure of this success was that of its healthy financial conditions, all debts and current bills being paid and, for the first time, a surplus accumulated. He wanted to see the association branch out in new lines of endeavor, and among other things he hoped that there would be a competent man engaged who would go from plant to plant and give advice where it was required not only on technical matters, but such business matters as cost accounting and the like.

He then read the report which covered the expenses of the association for the past year and the receipts obtained. It was quite satisfactory inasmuch as it showed that dues were being paid more promptly than formerly in addition to the fact that they now permit the introduction of newer work.

After the adoption of this report, the program of papers and discussions was begun by an address on "Winter Construction," by H. D. Wright of the Portland Cement Association.

Winter Construction

In introducing Mr. Wright, the president had spoken of the Portland Cement Association's wonderful work in promoting the use of its product by showing the public not only the capabilities and possibilities of concrete, but also how to make it economically, even where this economy involved the use of less cement.

Mr. Wright acknowledged this gracefully on behalf of the Portland Cement Association and said that he was convinced that there was an opportunity to educate the public in regard to sand and gravel, and he believed such work to be of paramount importance to the industry.

Would Not Use Sand and Gravel

To show just how important to the industry this was, he mentioned that the Bureau of Yards and Docks in Massachusetts had decided to make a series of long time tests on concrete, such as would be used in their construction work. They were a conservative and somewhat hard-headed lot of men and intended to use only crushed stone as aggregate in these tests. It was with some little difficulty that they were convinced that sand and gravel should have an equal chance, but finally samples made from sand and gravel were included in the test.

Returning to winter construction, Mr. Wright said that the advantages of building in winter as well as in summer were self-evident. There had been no difficulty in lining up the government and the principal contractors' associations in favor of it. Considerable progress had been made and no doubt the producers present had seen that progress reflected in their business. But this was not to say that the limit of winter construction had been reached.

There should be a campaign of education in favor of winter construction started through the papers and the various organizations which would be interested. The daily newspapers, "which get right at the heart of the public," would be especially helpful. The banker who lends the money for construction and the realtor who promotes it should be educated in the advantages of winter construction and finally the producer of building materials should "clean house" and put his business in order to supply demands for winter work.

At least half the troubles of the building business come from seasonal construction. Every chart that is made of sales of products, of costs and of capital invested shows this plainly. And the matter is of importance at the present time, as history shows that every period of national prosperity has been preceded by a period of heavy building.

Bankers and Realtors Should Co-operate

A few of the larger contractors have educated their clients to winter building and some contracting companies have perfected winter organizations. But the banker and the realtor have made only half-hearted attempts to co-operate. This is something that should be remedied by showing the many advantages of winter construction to those who have money to invest.

When Mr. Hoover, at the President's request, called a council to see how unemployment might be lessened, it is significant that a great part of the time was given to the discussion of how to lengthen the building season.

Capital and labor should get together on this matter. There are 5,000,000 people employed in building in the United States and about $5,000,000,000 is annually invested in building. Winter construction would increase the length of the working year and spread both the wages paid to labor and the investment of money over a longer period.

Winter construction costs only 2 to 4% more than summer construction from carefully kept data. And this in most cases is more than balanced by the reduced carrying charge and overhead and the earlier occupation permitted.

Placing Concrete in Winter

Mr. Wright said he could speak from experience as to placing concrete in winter, as he had had experience in doing this where the work had to be done on schedule time. Contrary to the usual opinion, such work was not hard on construction crews, although it did tax the skill of the builder. But there is no factor of winter concreting but can be accounted for by proper presentation. Unloading frozen sand and gravel, for example, is very expensive, but there are ways in which this can be overcome.

The "take-a-chance contractor," Mr. Wright wholly condemned, for he said that frozen concrete is as bad as dynamite—and much less understood. The heating of water and aggregate is of vital necessity. Aggregate may be heated by piling on steam pipes and then covering with tarpaulins to keep in the heat. Water may be heated by a steam hose and the steam hose may be used for thawing out any ice and snow which is in the forms before pouring. After the concrete is poured it should be kept at 60 deg. F. for five days by the use of "salamanders" or coke stoves.

Mr. Wright did not approve of "anti-freeze" compounds, which are uncertain in their action and bad because they give a false sense of security. The use of manure and salt hay as a covering is good, but paper should cover the concrete first to protect it.

As a practical matter for the association, Mr. Wright said that he thought the association should have a committee on winter deliveries and suggested that the association co-operate with the Portland Cement Association in considering the problems of winter construction.

Workingmen's Compensation Insurance

John A. Gunn, president of the Employers Mutual Casualty Association of Iowa, spoke on the tendencies of insurance legislation and the dangers that might come from improper legislation.

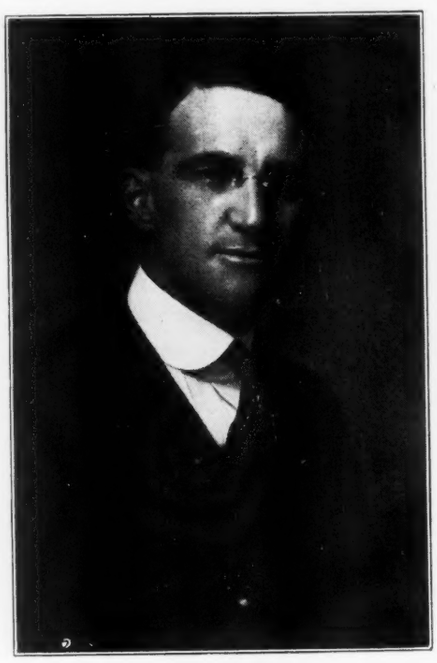
Mr. Gunn reveiwed the history of the relations between employer and employe beginning with the days when the employe was a slave and the master had to look after him because the slave was his property. When free labor came in there was no such obligation and if a man was injured he had to recover from his employer by law. Machinery introduced new conditions including a greater chance of accidental injury. Then began the period of litigation in which neither employer nor employe profitted—the day of the three defenses, the "fellow servant rule," "contributory negligence" and "assumption of risk by employe."

Out of this period of ambulance chasing and fake damage suits came the demand that industry should bear the burden of accidents and that this burden should be added to the cost of production. And from this demand has come our modern workingmen's compensation acts and insurance to cover the cost of compensation.

What Mr. Gunn wished particularly to point out was the dangerous lengths to which workingmen's compensation was being extended. It was getting to where employers in paying compensation insurance were paying life insurance and old age pensions. In some states this tendency had been carried farther than in others as was shown by the insurance rates. The rates in Minnesota are twice as high as in Iowa and in New York they are three times as high.

This legislation is encouraged both by labor unions and some of the stock insurance companies who naturally like to see high rates because their commissions are higher.

In concluding Mr. Gunn asked the members to keep watch on legislation affecting compensation insurance and to write to legislators if they knew of any attempts to extend the field of compensation insurance unreasonably.



Alex W. Dann

This address was followed by papers from members which are given as read:

Making Gravel from Sand

By ALEX W. DANN
Keystone Sand and Supply Co.

THE proportions of sand and gravel produced in the rivers of the Pittsburgh district are not balanced with the demand, meaning that there is surplus of gravel. This natural situation of the deposits in the river bed is aggravated by the presence of a very large commercial slag industry and a large production of crushed stone.

For years gravel has been washed back in the rivers to secure the sand. It is worse than wasted, because its presence there in the bottom of the river prevents a complete recovery of the valuable sand. Much time and money has been used up to stop this waste by designing some plant which will make sand from this gravel. With no similar plant as a guide, our company, after experimenting with many crushers, built a large plant to accomplish this purpose. Rolls only are used in the reduction and there are three sets. The primary rolls are 54x20 in., and the others are 36x30 in. Up to 3 in., or slightly larger material may be fed and the final product passes a screen with a 3/16 in. square opening, after three breakdowns (with provision for recirculation) three screens, three rolls and three bucket elevators all of which are driven by a 250 horse-power motor, which is of more than ample size for the work.

The process is wet, which means no dust, more capacity, and a cleaner product, dewatering being accomplished by elevators. We surmise that the presence of water may lessen the wear. As to the product, it makes a mortar and a concrete of exceptional strength when compared with the strength obtained from standard sand. It is free from loam and coal. Even if these things exist among the gravel, we have not yet found a clorometric test other than clear.

It is not recommended for brick or plaster work. While it suffers somewhat in comparison with natural sand as to workability, so does natural sand suffer when compared with foundry sand. Ordinary care can and does make very excellent concrete.

As to process, while it is not perfect, it has demonstrated its commercial success. Experience is pointing out readjustments to reduce wear, increase capacity, and further lessen the cost.

The time is coming, and the date we do not know, when building in the Pittsburgh district must be done either with inferior sand, with superior sand shipped

in with a very high freight rate, or with manufactured sand, because the natural sands in the rivers will be gone.

Repairing Bad Order Cars

By W. E. ROGERS
Arkansas River Sand Co.

HERE are the echoes of conversation about our plants: "Why so late getting started?" "That second car isn't fit to load brush in; took an hour to put it in shape to load." "This car had no

W. E. Rogers

brake, could not stop it at the tipple," or possibly, "We were thirty minutes shoveling coal dust from each car." Is this familiar talk?

Then we get letters from our customers, "Don't use so much hay, it doesn't make good concrete." Another, "Please ship us cars with straight sides, the last one bulged so it would not clear our sand bin." Another, "While unloading your car of sand our man fell through the bottom of the car, hurting himself. Please use better equipment."

In the building of boats, pontoons, tipples, etc., we have spent thousands of dollars, and as these are replaced, the salvage goes into the junk pile, which is drawn upon for car repairing, which serves the purpose as well as new lumber, but this supply is soon exhausted. In the course of a year, bad order cars take a great deal of money from our plants in the form of labor and lumber. I believe I am safe in saying it consumes more time to prepare a car to load than it does to load the car. Sand spurs are railroads' free rip tracks where cars are cleaned and repaired.

The only remedy for this that suggests itself to me is to adopt a form of report; then each time a car is spotted unfit for sand loading, fill it out, showing car number and initial, what is wrong, and send it to the railroad serving you with a copy to our secretary. Once or twice a year, a concise, general report could be sent the respective heads of the railroads, whereby the officials of each road could note its standing by comparison, and if any railway continued at the foot of the list, it might do no harm for the car service division of the American Railway Association to have a copy.

As to car chinking, an expense that will be with us always, I should like to see a committee ascertain the manner of handling at each plant, and after procuring data of various methods, make recommendation through our *Bulletin*. The known methods to me are laths, hay, wire screen, and paper. Laths are expensive but useful in that the car put in shape may be returned for reloading. Our committee might develop this as the most practical method and with a majority of the producers lathing cars, we would receive the benefit of each other's work, or possibly by cooperative buying, we might procure a cheap grade of laths cut from slabs.

Discussion

MR. J. L. SHIELY: One of the things that I have learned in traveling around the country which has been of great benefit to our company is a method of repairing cars, I think the best one, the one that I use, is the use of scrap bags. We have, during the past year, been able to get the scrap companies to pick up scrap burlap and we buy it cheap, and it is the best car patching material I ever saw. The railroads return it to us free of charge; after a certain amount has accumulated at some shipping point, they send it back to us. We have a service truck that goes around to the different points to which we ship by truck and picks up these bags and brings them back to the plant, and we use them over again.

MR. CHAS. H. YOUNG (Robbins, Young Co., Minneapolis): We have been able to get the railroads who serve us to furnish lumber. Our cars cost us about $2.40 apiece cooperage. We use tar paper; it takes about a roll of tar paper to a car, it costs seventy cents. We have found that quite satisfactory.

My Experience as a Manufacturer of Concrete Brick

By A. P. BURKE
Atlanta Sand and Supply Co.

THIS is not a meeting of concrete products manufacturers, but it is generally understood that every sand, gravel and stone producer has a certain percentage waste material which might be made into products and if the promoters and salesmen do not call on you personally, they will very likely reach you through the mails by advertising. I am, therefore, assuming that you are prospective manufacturers and will attempt to outline very briefly the course that I think you should follow if you consider going ino the business, and incidentally mention a few of the problems that can not be technically dealt with.

After a careful study of the literature of the subject you should visit a number of plants for the purpose of gaining first hand knowledge of the practical applica-

A. P. Burke

tion of what you have read. Determine the local conditions, including the competitive materials, the availability of such materials, the price, and whether or not deliveries are dependable and prompt. You can learn other owners' costs by taking their quantities of materials, their labor hours, and apply your cost of material and wage scale.

All of this information is essential in reaching a decision as to whether or not your local conditions are favorable to the manufacturing and the sale of concrete products. If they are found to be favorable, it then becomes important to determine to what extent you will go as an investment in the proposed plan.

It is my opinion that the products business offers a splendid opportunity for the installation of a small plant with provisions of extensions to meet future demands. If you contemplate manufacturing face brick, it is my opinion you will find that no concrete face brick has been successfully and commerially manufatured without the use of the Shope patented process. Since we have been operating we have made many tests and experiments; so far we have found no method by which the face of a brick can be water-proof, coloring material used and the variation of

textures gained without the use of the Shope method.

Using waste materials sometimes proves disappointing. In the case of screenings, particularly, they do not always contain the proper grading to give the desired strength with the minimum amount of cement. We have found some of these materials can be made satisfactory by re-screening, using everything retained on a ⅛-in. screen, and adding natural sand to get the desired grading.

We also find that it is not economical to use a material that does not contain the proper fines and correct percentages of fines, as the additional cement necessary to bring the product up to the requirements of specifications makes the cost excessive.

Assuming that your plant operation can be made a success and you can deliver a satisfactory product, it then becomes important to face the big problems, the educational, promotional, and sales work. This is often underestimated. We have found that most of the small users were content to use the materials that their fathers and grandfathers had used. From their point of view it was entirely satisfactory, and they were not interested in trying new products. The larger contractors contended that they use what was specified, there was no use talking to them, "go ahead and sell the architect." We found the architect inclined to evade responsibility in specifying any new material that had actually been proven successful by us in his own locality.

I hope that you will not understand from this that I am attempting to discourage any man who is contemplating entering this business, or that I claim the products can not be successfully introduced in a new market. Men have many times proven that a large business can be built up in a short period of time; but it can only be accomplished by starting right.

I think our company made a mistake by starting into business very quietly; there was no advertising or publicity whatever until we had a large stock of concrete brick ready to move. I believe as soon as you reach a decision to go into this business, the educational work should begin; newspaper stories dealing with the progress made and what is being done in other sections of the country. Another story that would help would be of the wonderful progress made in the use of concrete. I think that such a story could show that concrete has practically replaced all other materials for sidewalks, yet only a short time ago it was necessary to do considerable educational work to get concrete accepted in roads and streets for paving.

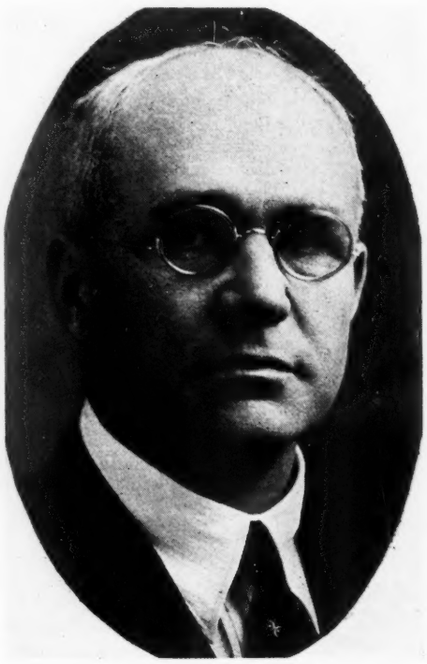
I don't think many people realize the wonderful progress made in the concrete pipe industry. It is now estimated that half of the pipe being used is concrete. I think in this connection it would be effective to emphasize the fact that concrete has been adapted to these many uses by a scientific method and that by control of the grading of aggregates, molding, curing, and so forth, many kinds of concrete can be made without losing any of its good qualities as to strength and permanence.

There was no open discussion of Mr. Burke's paper but about 20 members went with him to another room for a discussion of the concrete products industry. A report is given elsewhere in this issue.

Loading Materials in Freezing Weather

By R. SNODDY
Coon River Sand Co.

I DON'T see why the Secretary handed me this subject. I have been in the game for eighteen years and I have always prided myself on having sense enough not to try to load sand and gravel in the winter time. I have never undertaken it. I



R. Snoddy

have visited a great many plants, some of them that were trying it, and I just briefly will give you a few items that I picked up around the other fellow's experience.

In the first place, I would advise you to construct your plant with sufficient capacity to take care of your immediate needs during the summer and accumulate storage sufficient to load out all of your orders in the winter time, and in that way avoid any operation in the winter and still be able to accommodate your trade the year 'round. If you are constructing a new plant, my advice would be to build it on the tunnel system, and do all of your loading, winter and summer, from the tunnel, and don't have any bins at all. If car shortage holds you up for a week or two at a time or if there are no orders, why your production end keeps steadily grinding along and piling it up. I have seen some of those tunnel affairs that would accommodate a whole year's run for one of my plants. The fellow with that kind of equipment is well fixed to take care of the situation at any time of the year, because his stuff doesn't freeze in the bottom of the pile. It, of course, should be provided with drainage.

If a fellow has the ordinary type of bin with the screens up on top or if he is operating from a dry pit, he has already passed up a whole lot of his grief. It isn't a big job to build a temporary structure over his screens covered with tar paper or to cover the side of his bins with tar paper and put in a little boiler of about fifty horse-power—it doesn't need to be a very high pressure affair—and put steam pipes in the bins. In that way you can operate in the winter time. You can only operate a portion of each day. You can't start early in the morning and run until late at night the same as you would in summer, but during that part of the day when the weather permits you can operate and accumulate in your bins and let it stand overnight, and with the steam pipes to keep it warmed the screened gravel will practically dry out. The next morning before you start operating, load this material out into your cars; it is not only practically dry, but it is warm enough that it isn't going to get completely cooled off for about 24 hours in zero weather, and it can reach its destination and be unloaded without any difficulty.

Sand is a different proposition. You can't sufficiently dewater that so that you can dry it out. It is advisable to have two sub-bins, as we call them, at your plant. Make an excavation and put down posts and board them up so as to have a bin down underground with the drainage going back to some other place. You have two of those; the one that you load today you unload tomorrow, and vice versa, and by picking this stuff out of the bin with the clamshell, you put it onto the car loose. Now loose sand doesn't freeze hard. Quite moist sand, if it is put on the car loose, can stand zero weather for a couple of days and be unloaded with very little difficulty, but if you put it on the car with water, as is done in most cases, the sand is packed, the little ones get in between the big ones, and you have concrete when it gets cold and you are up against a job to unload it.

Another method of stock piling is to spout from the top of the bins or to load cars, push up the track with your crane

and unload into piles. That not only covers loading in the winter time, but it provides a method of continuous operation in the summer at a time when business is otherwise dull and when you might be closed down for the want of orders.

We have just recently put in a caterpillar crane for the purpose of storing material not needed at the time of operation. This plant stood still the first half of last year for the want of orders, and about the balance of the year it could have sold three times its capacity. We want to meet that condition by piling the stuff up, spouting from the top of the bins onto the top of the ground, and then passing it down to the tracks with the crane.

But it is like the old fellow said when he was out hunting, if you have just got to operate in the winter time, the best way is to not do it.

Discount Rates

Mr. Snoddy's paper was followed by a paper, "What Discount Rate for Prompt Collection," by A. Z. Frosch, East Liverpool, Ohio, Sand Co. This would lose considerable by abstracting and for this reason it is left for full publication in a later issue. After the reading of Mr. Frosch's paper the meeting adjourned.

Tuesday Afternoon Session

THE first address in this session was made by Nuel D. Belnap, a Chicago attorney on the "Weighing of Materials and Legal Obligations of Carriers with Respect to Installation of Track Scales."

This paper is one which is of importance not only to the sand and gravel industry but to all the rock products industries and for that reason it has been decided to publish it in full at a later date. For the present it may be said that Mr. Belnap confined his discussion largely to what the Interstate Commerce Commission had said on the subject with an interpretation of the law. There was no objection to estimating weights providing a proper basis for such estimating. The best way to avoid litigation is to have an agreement with the carrier on what materials actually weigh per unit, as a cubic foot or yard. A case from Minnesota was cited in which the consignee claimed that it was over-charged because the sand and gravel from a particular pit was estimated to weigh 3200 lb. per yd. Proof was offered that material from this pit weighed only 2680 lb. per yd. The commission threw the case out because the tests on which the claim was based were not made until a year and a half later.

As to the obligation of the carrier to install track scales this hangs on the question as to whether weighing is a transportation service or not. The Interstate Commerce Commission has never been requested to compel carriers to weigh freight, but federal and state statutes generally define transportation in such a way that weighing is included. But carriers cannot be compelled to weigh every car loaded, as in the case of a gravel pit where a small amount of tonnage originates. It was that sort of traffic the commission had in mind when it approved estimated weights.

In the case of a pit producing large tonnages the situation is quite different and weighing must be considered as an essential part of a good transportation service. Producers have a right to ask carriers to install track scales but the measures to compel them to comply will vary in different states, as the Interstate Commerce Commission has no jurisdiction even though the traffic is interstate.

Mr. Belnap gave the law in several states and said that in states in which there were no specific laws courts of equity were empowered to compel carriers to furnish whatever facilities were necessary to serve the shipping public.

Glad Hand Committee

After this address President Prince and others spoke words of welcome to the visitors present and a "glad hand" committee was appointed consisting of V. O. Johnson, Frank Peck, David Alexander, J. L. Shiely, George Ross, E. Guy Sutton and Hugh Haddow.

A Talk on Ohio Highways

L. A. Boulay, state highway director of Ohio, gave an excellent talk on the highway policy of his state and some of the modern ideas in road making. He spoke of the roads that had been found impassable during the winter months and said that the department had thought its proper function was not only to build roads but to get people over the roads and to try and get them over the roads every day in the year. That is why "stage construction" had been adopted. The roads were gravelled and the soft spots that always appeared in the spring were taken care of in maintenance and in this way the road was not only kept open but a good foundation made on which a now permanent type of paving might be placed at a later period.

He told an excellent story of a farmer who lived on a hill at the end of a poor road and who complained of the difficulty of getting the necessities of life into his home in winter and said that "when you got the stuff up there it wasn't fit to drink." Mr. Boulay said that he wanted to see roads enough built so that the people who lived in such localities would have something else to think of than copper stills.

Underlaying Concrete Roads with Gravel

He spoke of the colloids in soils, a new name to many people, and showed how that if these could be reduced in the ground under the pavement the pavement would not be thrown up with frosts or crack for want of support. Sand had been found excellent to mix with highly colloidal soils to reduce the percentage of colloids and consequently the danger to the pavement. And a better practice is that of putting a 4-in. layer of sand or gravel, because this breaks up the capillarity of the soil and prevents the moisture from reaching the pavement.

Transportation surveys had been conducted in the northern part of Ohio and it was found that 7/10 of all the trucks using the highways were overloaded. This he felt was wrong. If the load limit is too low it should be raised, but once such a limit is established and the roads are designed to bear that limit he felt that it was wrong for trucks to exceed it and thus break up the pavements.

He was strongly in favor of a state traffic police force—not a constabulary—a police force wholly devoted to the enforcement of the motor-vehicle laws.

At the conclusion of Mr. Boulay's talk President Prince introduced Mrs. Filler, a former member of the association who was better known to the members as Miss Hazel Cummins of the Urbana Sand and Gravel Co., Urbana, Texas. Mrs. Filler made a pleasant speech in which she said that she was as a sheep which had wandered but was coming back into the fold of the National Sand and Gravel Association.

Discussion of Methods

There were no more set papers in this session, but there were short discussions of various topics which had been printed in the program. Some of these follow as given in the stenographer's report.

Digging Methods

J. E. CARROLL (J. E. Carroll Sand Co., Buffalo, N. Y.): I have come to that point where I have to make a change in my present method of getting material from the bank into the hoppers, and it is a question whether I shall use a pump or dragline or steam shovel or slackline cableway. I would like very much to hear from somebody here that has experience in bringing material to the plant by water by a centrifugal pump. If there is no one who can answer that question, I would like to have someone, especially around this district, in Chicago and Illinois, give a little talk or explanation on a dragline excavator.

PRESIDENT PRINCE: In order to start it, Mr. Carroll, I don't know whether this is what you have in mind or not, but we have had an interesting experience in the last year or two in conveying by booster pump. The distance from our dredge to our tipple had become so great that we coudn't convey enough with the single pump on the boat, and we installed

a booster pump station on the bank. We are pumping through fifteen or sixteen hundred feet of 10-in. pipe line with a 10-in. pump against a head of 60 or 65 ft vertically. At least we are able to equalize the water passing through the booster pump so that we have a uniform load on that pump and a more uniform mixture of sand and water from there on. The economy in saving the pumping of a considerable part of the water as it comes from the dredge is quite considerable. It isn't as economical a method of transporting, but under our conditions it seems to be the most practical way of doing it, and we have two installations of that sort. Has anybody else anything to offer?

MR. CARROLL: Mr. Prince, do you pump your material direct into the top of your plant or do you put it in a pit and de-water it before you elevate it, and if you elevate it, how do you elevate it?

PRESIDENT PRINCE: We pump from the dredge into this de-watering pocket located at the bank and from there it is again pumped to the top of the de-watering corner or tipple where it is discharged into the car further on.

MR. CARROLL: You only pump sand?

PRESIDENT PRINCE: This applies only to sand, as that is all we have in our territory.

MR. CARROLL: I am not asking for advice as to pumping from a river, or a lake. I am trying to change my land plants from present methods to a pumping proposition the same as is done, I think, by Ward Brothers of Detroit. I think there are some of the people out here that must be using a pump to pump up.

R. SNODDY: I have had a little experience. I will say that if the material doesn't carry too many big boulders it can be pumped. It makes very little difference about how deep it is. If there is not over 1000 ft. to carry it, it can be done. He can't excavate it out of water and carry it to his plant in any more economical manner than he can with the centrifugal pump. I don't believe that he could put in anything that would convey the same capacity of material, the same tonnage with the same amount of invested capital. When it comes to elevating up to the top of high bins, 75 to 100 ft. in the air, it is a little different question. There are some circumstances under which you can pump the material up there as cheap as you could elevate it otherwise.

If you can put in a system of de-watering the material at almost the level of the water from which it is pumped and elevate the material alone to the top of the bins, then you are saving on the elevation of such a large quantity of water. There are several systems of doing that; a quite common one is a dredging bucket on an elevator, while others use clamshells. It doesn't take much power and it is not an expensive installation and has quite a big capacity. If you can devise a satisfactory manner of getting the material from the ground up to the top of your bins, then I would advise de-watering the stuff down at the ground. The stuff doesn't need any further washing after it has been put through the pumping system. If you have some system of cleaning it without water, you don't need to put it in water up at the top of the bins. Most of us have to put water up there to get it through the screens.

E. J. PROCTOR (Genesee Gravel Co., Mt. Morris, Mich.): Mr. President, if the gentleman is interested enough so that he can spend the time and the money to visit Oxford, Mich., about 40 miles north of Detroit, he can get ideas from those three plants which perhaps would be of a good deal of advantage to him in installing a pumping system. There are five large plants at Oxford and they claim the Ward outfit is the largest in the United States. Whether it is or not, I don't know, but it is well worth visiting. Then there is Koenig and Fuller-Beck.

The Fuller-Beck, I think, is the simplest plant. They have a dredge, I believe a 14-in. pump and a booster station at the shore and move material about 70 ft. That is a very simple and economical plant to handle and operate and gives a good production.

The Ward Sand and Gravel Co. has an estimated production of 200 cars daily. It is a very excellent plant and very elaborate. If you are contemplating the installing of a pump, I believe it would pay you to visit those three plants.

MR. CARROLL: What proportion of gravel?

MR. PROCTOR: They handle about 15% solids and the gravel varies. Some of their pits run 70% sand, some run high in boulders, others do not.

A. E. FROSCH: In our territory we are not equipped to pump. We found every person that ever tried it has gotten into difficulties because our material is river material and we have too great a quantity of gravel. I was just wondering in Mr. Carroll's case whether he was attempting to raise his material separately, whether he had prepared material he wanted to get up to the top, or whether he wanted to get the combined stuff there and prepare it afterwards. That is a vital question in connection with any investigation I find in regard to pumping. The difficulty seems to be where there is a greater preponderance of gravel over the sand, the pumping method does not work out so successfully. Where you are handling the product and your sand is in proportion to the gravel, you get good results.

OTTO S. CONRADES (St. Louis Material & Supply Co., St. Louis, Mo.): Mr. President, we pump from 60 to 70% gravel to a 16-in. pump. We have been pumping as far as 800 or 900 ft. We are now pumping in the barges very satisfactorily. The largest size gravel going through there runs about 6 in. I wanted to bring out the point you could pump the large percentage of gravel. We are pumping, 70%, at this time satisfactorily.

Comparative Costs of Electricity and Steam and Gas Power

PRESIDENT PRINCE: Mr. Carroll also raised the question of the relative merits of electricity, steam and oil, as I understand it. Perhaps it would be well to have a little discussion, if we can, on that question of electricity, steam or oil engines as prime movers. You are all using one or the other, perhaps all of you wish you had the other.

FLOYD GOODRICH (Humboldt Gravel & Tile Co., Humboldt, Iowa): We used a locomotive crane operating a clamshell bucket, used the steam crane for five years. Our average cost per cubic yard of material excavated from a pit approximately 30 ft. below the track level was four cents per cubic yard. By changing to electricity we have reduced that about one cent. The cost of coal, however, has varied. The years when we were burning coal were from 1914 to 1919 when coal was costing us approximately $4 a ton on track. Today we are buying electricity at 3 cents per kilowatt hour.

ALEX W. DANN: Mr. President, we have for a number of years used steam and we still use some steam, but where we have made a close analysis of cost with the steam equipment counting the cost of repairs to boilers, etc., our costs run about two and one-half cents a ton and with the electrification of most of our plants now we find that our power cost for hoisting runs from six-tenths of a cent to a quarter of a cent and a half. It is very much cleaner and very much more economical, a better way to handle the material.

MR. SNODDY: We have an illustration of difference of cost that we think possibly is unusual. We had one plant equipped with electricity throughout, the other plant with steam. We checked the two plants very carefully. The operations were by no means exact or duplicate. The one with electricity had a great deal more movement about it, more elevators, etc., but at the end of the year we found the electricity had cost us, the total operation of the plan from the excavation to the loading on to cars, plus the coal we used on one locomotive crane which, of course, was a small part of the total, 2¾ cents per ton of material. At the other plant, the dredging proposition on the river—we had to count in, of course, the expense of unloading the coal and taking it out to the dredge and carrying the ashes

back, and the fireman and flue trouble on your boilers, and so on—at the end of the year we had 11½ cents per ton. That was quite an extreme, and it caused us to put in electricity.

E. J. PROCTOR: We operate our plant by steam. Our excavation is done by steam and gasoline shovel. Our yardage cost with the steam shovel was 4.6 cents, with the gasoline shovel, 2.5 cents per yard. We would like to equip with electricity but we are so far from any electrical power line that it isn't practical as yet to install it.

PRESIDENT PRINCE: In my own company we have electrified everything we could reach from truck loader to locomotive cranes, stationary derricks and pumps and everything we could reach. While perhaps the apparent cost is not always less than some other kind of power, the usefulness of it is increased. You pull the switch and you are through, you don't have anything else to do until you are ready to start again. The question of obsolescence is greatly reduced. A motor lasts a long time and is useful for many more years than a steam boiler or an oil or gasoline engine. On top of that in some cases the first cost is very greatly reduced and consequently the loss of your equipment through age, depreciation, etc., is much less. I am thinking now of pump boats. Our pump boats can be built for less than half electrically equipped than you can build them equiped with oil engines.

Problems of Personnel

Mr. Dann has raised the question regarding the personnel, what we can do, I take it, to reduce the turnover, to increase the efficiency of our labor problems. Mr. Dann, will you state your proposition?

MR. DANN: Mr. President, I am not sure that I have the problem clearly enough in my own mind to state it. I think that we, the producers, should put forth an effort to increase the efficiency of the personnel of our organizations, that is to get better manpower. I don't mean by that so much to see that a man works his eight or ten hours a day, or whatever it might be. We expect to put on foremen to see that the men do a good day's work. We find in our own particular case as we grow the personal touch, of course, of the management of the company with the personnel all the way down the line is lessened, which, of course, is a common occurrence.

How are we to keep before those men all the time the fact that aside from being on the job every day, they are to render to the company for which they are working, in return for their compensation, diligent and sincere work. We have found over a period of years that a good deal of our trouble was breakdowns, and we ran into those all the time. They have their primary cause very often in the letting down in efficiency of some man. If you analyze it far enough it is because some fellow didn't completely do his bit. I don't know what the answer to the thing is. I don't know what we are to do to improve the personnel. I am pretty sure it isn't in more wages. No company begrudges the wages or begrudges an increase of wages to the man who does consistently and diligently look after his work. The problem is to get more men in your organization to whom you can afford to pay more money. We are attempting to work the problem out in our own business. It seems to be the best process to educate men to do the work right and promote men from our own organization rather than go out and hire somebody who has been made or developed only half way by some other industry.

The Engineer and the Laborer

MR. SNODDY: We checked our pay rolls this fall and we found that the average time which the men had been with us from the night watchman up was a little over five years. We started a new plant 20 miles out of town that required ten men and the first three months we hired twenty-five, but after that we had culled out and secured a good bunch. That was two years ago and we still have eight out of the ten. We have tried to put a premium on brains among the men and reward a fellow if he brings up a good suggestion. We had one place where we were driving with a chain. About every so often something would get hung up and we had a couple of good engineers to look the thing over and they couldn't help us out. One laborer jumped up one day and said, "I will tell you what to do. Take a file and cut a few links in the chain and make it weak so when something hangs the chain will break, or else put on a very weak chain." We had a chain on stronger than was necessary. His idea saved us several hundred dollars. We gave him a check for $10. Of course, it seemed like a small per cent, but he was glad to get it. It caused the boys to keep their eyes open for that kind of thing.

Carrying Life and Accident Insurance for the Men

In addition, in order to keep our plant crews on the pep all the time, we carry a life insurance for the men. It doesn't cost us but an average of fifteen cents per month per man. Then in addition to that we are compelled to carry compensation insurance, accident insurance. We also carry an additional accident insurance on the men, so that in case of accident laying a man up he will draw within about $5 a week of the amount of his wages.

Those things we believe have improved the quality of labor more than wages, because there are many industries that pay more wages than we do for the same class of labor. We have many things we check men by as to their qualities. One was unloading a car of cement. Long before the war when we paid $1.75 or $2 a day for a 10-hour day of labor, one man would unload a car of cement and put it in the house in seven or eight hours. Immediately after the war when we paid $6 or $8 a day, it took two men all day to do it. We have gotten back now where one man will do it in a day.

I don't believe there is anything any more important around your plant or even in your office than to have people who are absolutely loyal to you and who will stay by you and that you can trust to do the work when you are not there, and people with such intelligence to know what to do when something new comes up that they haven't previously had instructions on.

The Bonus Method

C. F. MULLEN (Florida Gravel Co., Cleveland, Ohio): I might mention we have tried the bonus method and with some success. Changing from construction work into the producing work, we kept quite largely our same men, and about one man at the producing point and one man at the rehandling point, say a mile and a half or two miles away, and one or two men on the way passing back and forth on a bonus basis and we find it works very well.

PRESIDENT PRINCE: I am glad the speaker mentioned that. We have had the bonus method in operation for several years and we find it meets some of the questions very satisfactorily. Our men at our producing points have paid them a wage that is just about a living wage and the balance of their pay is in bonus on production. You never saw a breakdown where all the crew didn't get on it right away. There wasn't anybody that was too busy to get down there and keep the thing going. It certainly has worked very well and neither the men or the company would care to change that arrangement we have.

MR. FROSCH: In going over the bonus proposition I would like to have a suggestion as to how it is handled, taking into account the length of time the man operates for you. You usually have a very large turnover in the busy season.

Bonus for Special Service

J. L. SHIELY: We are paying on a basis of 10% over what the going wage is in that locality. In addition to that we have a dinner at the end of the season. We have a good many meetings during the season at our plant where suggestions are offered from time to time, but our final meeting at the end of the season is in shape of a dinner. At that time we distribute presents for one particular efficient thing one man has done or something that he has accom-

plished during the year to help the operation of those plants.

Those bonuses amounting to $3000 were in the shape of little prizes or appreciations for individual things that different men had done. Our men, as Mr. Snoddy's, will average over five years' service all through down the line. I think it is like money you would spend for oiling your machinery to spend money this way to build up that feeling of co-operation between you and your men.

MRS. D. M. FILLER: We have changed the method of giving bonus several times. During the past year instead of making it a matter of production we have taken it on a monthly basis, and if they have been there every day and worked the full amount of time they get the bonus. Of course, if they are off on account of sickness or accident, they are excused on that score. We work a great many negroes down there and it doesn't take very much for them to lay off. We found by holding them this way and giving it every month, it holds them very much more than if we would make it a six months' or twelve months' proposition. We pay the bonus according to profits as well as production. They can get production and make your profits very much less by costing you more to get that production. We have found by paying them according to profits and paying every 30 days, those that have been on the job from the 1st to the 31st, we get better production and get better co-operation than we have ever had before.

MR. MULLEN: I might add we include a bonus every week and base it on the tonnage put out during that week. A man not there, a man absent a day gets no bonus for that day.

CHAS. H. YOUNG (Robbins, Young Co., Minneapolis, Minn.): Due to the fact we have one plant in the country and one out of town, most of our men are unmarried. We run a camp, have shower baths and all the furnishings and fixtures to make it comfortable. At the Dulench plant we haven't changed a man in five years. In Minneapolis we haven't changed a man in two years. The boys get to feel they are one of the family. They don't pay for their keep. We use a little money in it. We found it is quite effective and we can maintain a much higher class crew by allowing them to live in the camps rather than boarding houses and places out in the city.

Standardization of Products

MR. YOUNG: There is a tendency in our section of the country by architects and engineers to have a wide variation in size and grade of materials. It is often necessary for producers to go to the architect and engineer and inform him the grade of material he specifies on a particular iob is not made and if he insists upon receiving this special material it will naturally cost more money.

We make now four different sizes of gravel and three of sand. The tendency seems to be to increase the number. I have one job in mind we are furnishing now, a bridge that will require approximately 70,000 cubic yards of coarse aggregate. The architect and engineers specified the maximum size material was an 1½-in. The next average size of ordinary aggregate was 1-in. Now 1-in. material is not made in our district. We have other men who insist upon material of ¾-in. and under; others that want ⅝-in., and others that want 1¼-in. I think that this association should get together with the American Concrete Institute or the Portland Cement Association and standardize on sizes.

On this bridge the 1½-in. material is going into caissons, 2 ft. walls, 20 ft. in diameter, 16 ft. core, little reinforcing; 2¼ and 3½-in material would be much more suitable and produce stronger concrete, yet the architect and engineer for some peculiar reason specified 1½-in. not getting the strength they would get out of a larger maximum size material. I think we should work with some of these other national organizations to standardize on sizes.

PRESIDENT PRINCE: The Portland Cement Association certainly have done a lot of work, very definitely showing the increased strength of concrete with the increased size or maximum size of the aggregate. I am surprised that any well informed engineer today would do as you describe.

Has any one anything to say on this subject?

Two Solutions of the Problem

MR. DANN: The idea among the engineers is that each fellow must have a little bit different size of stuff, which seems to be a development of the last two years. It has been particularly so it seems to us in our district. We are getting requests on all sorts of different sizes of special gravel.

We have attacked that thing in two different ways. First of all, we have raised the price on the special stuff. You will find in our district this coming year that the engineer and contractor will be paying more for gravel which is not nearly as suitable for the purpose as the cheaper stuff. It isn't what he ought to have. but he wants it nevertheless through some sort of a mistaken idea and usually it is ignorance. If he finds he is going to have to pay more for that special stuff, he will be inclined to use the other stuff which he knows is better for him.

Aside from that, we have been working together with the Engineering Society of Pittsburgh. We have asked them and they have complied with our request to appoint a committee to investigate the matter of specifications and specify what they think, after considering the local character of the material, will give them the best job for all classes of concrete work. I think those are two things you might work with to head off that special stuff.

We are not opposed to furnishing special stuff where we know and realize that it will make a better job, but we try to head off special stuff which we know is not as good as something else.

River Cutting Banks

W. E. ROGERS (Arkansas River Sand Co., Tulsa, Okla.): I think we have the problem of bank cutting fairly well solved now. I have a plant on either side of the river where there is sort of an "S" turn, and we are in the cut on each side. We tried several different methods. What we finally did was to haul in a lot of brush and riprap the bank from one end to another with the brush. We tied little bundles up together. We take a sack of sand to weight the bundles until such time as it would begin to collect drift. We built a bank in that way.

The banks were washed so that you wouldn't dare walk on the top of the bank. Now we have the bank sloped the way it should be. Before that we used rock and different things and it seemed to wash it all away. We have something light now that will collect drift and let it fill.

A Unique Haulage System

HUGH HADDOW (Menantico Sand & Gravel Co., Millville, N. J.): It was told to me that I had a unique system of hauling and it might be of some assistance to somebody else to know about it. I fell heir to a certain amount of narrow gauge track and a couple of narrow gauge locomotives when I got the plant. I didn't want to discard them, so I built the narrow gauge track parallel with my standard gauge track and simply used the narrow gauge locomotives to move standard gauge equipment up and down the other tracks with a cable, using any old cable we had around. We used the narrow gauge locomitives to move loaded cars and take the empties down below the loading plant, and after they were loaded we used the narrow gauge equipment for hauling the load out of the way. It saves the expense of putting in a standard gauge locomotive, which would probably be idle seventy-five per cent of the time, so that really it is an economy in our district. I don't know as I would advocate it in a new plant possibly, but somebody else might have the same condition I have and it might be of some use to them.

Removal of Trash

MR. MULLEN: I wonder if the question of removal of trash would be of interest.

MR. SNODDY: I don't want to appear as knowing something about everything that comes along, but it is about one of the simplest propositions in the world, I think, to remove trash from river products in a plant. Not that I want to advertise what somebody else manufactures to sell, but a fellow in Des Moines has a patent on a box that he puts the water in one end and the water comes up while your gravel is going down. You gauge the speed of your water so that good gravel can fall down about twice as fast as the water is coming up, but your sticks and leaves and stuff like that will only settle about half as fast as the water is coming down, so the light stuff can't go down and the heavy stuff can. It is taken out of the water box with a little elevator with perforated buckets to drain the water out, with a capacity of two cars an hour. I think he figures 350 g.p.m. of water. He can only put one grade of material through the same machine. If you are going to handle sand and gravel you have to separate it.

MR. SHIELY: Mr. Snoddy, what would you do if you had heavy bark deposits in a river and the bark was almost the same specific gravity as your lighter stone, and small particles of bark were going to break up and get in the sand? Is this plan working anywhere where anybody could see it?

MR. SNODDY: I have two of them in operation and there are several others in that part of the country. As a test on one of mine, I took a wheelbarrow half full of clean gravel and filled up the other half with lumps of coal and sticks and leaves which had been taken out of gravel by this and stirred it up and mixed it until I had a pretty fair mixture of gravel and fifty per cent leaves and sticks, and took a block and fall line and swung it up over the box and put it in. We caught the good gravel on one side and the sticks on the other. We went through the gravel and the nearest we could estimate there was a little less than one-half of one per cent of objectionable material left in the gravel. You could just find a little piece of something here or there that might have been sticking to a pebble.

Wednesday Morning Session

IN opening this session President Prince remarked that for the first time in the history of the Association's Conventions they had run out of badges. Then he introduced Robert H. Ford, Assistant Chief Engineer of the Rock Island R. R., who discussed gravel ballast.

Mr. Ford gave the producers a lot of straight talk. He defined ballast and showed its purpose and told how loads on the road bed surface had increased 30 per cent in the last three years. The dynamic effect has increased six times over what it was 50 years ago. As the tonnage loads have increased the quality of the ballast has had to be bettered to stand the increased dynamic effect.

He said in part:

"There are 288,000 miles of railroad in this country, and approximately 43,000 of them are unballasted, or are light lines that do not require ballast. There are 70,000 miles that can get along very well with pit run or light material, but there are 175,000 miles comprising the major tracks of this country that have got to be ballasted with first class material. Now to keep that up requires approximately 30,000,000 yd of ballast a year. We are not putting on 30,000,000 yd. of ballast, but we are putting on pretty nearly that, somewhere about 24,000,000 or 25,000,000.

"Railroads, as you know, due to financial conditions have not advanced. The railroads of the country have decreased rather than increased. We hope, however, that with the changing conditions in the country, the constructive mileage will increase in the way of double grades, grade reduction, and so forth, and will call for more and better ballast. When that time comes, I imagine that the ballast output, say during the next five years, ought to run somewhere about 35,000,000 yards a year. Now that puts the railroads as one of the big gravel users in this country.

"There are only two kinds of ballast today that are fit for first class track—rock ballast and crushed gravel. In my judgment, the advantages of crushed, washed and screened gravel, are great over the crushed rock. In order that I may not be misunderstood on that, I want to develop on that just a little. Feldspathic rock, a hard rock like the Pennsylvania is using is an ideal ballast, if the maintenance money is available to keep it up.

"Now it is surprisingly difficult to get hard rock suitable for ballast, mainly because of the rapid advance that has been made in it. When the ballast was tamped by hand, the powder effect was far less than it is today under the pneumatic air tamper.

"A good washed gravel of suitable sized material, properly graded, properly prepared, properly arranged, is an ideal ballast for a railroad, because it combines all the advantages that rock has, and I am not underestimating the value of rock at all, and in addition to that, it permits economical track maintenance. The effect of passing train loads is so great on many of our railroads today that it requires a continual working over of the grade, in order that the track may be kept in good service and that the effect of the shock of the motive power may be minimized.

"Briefly, then, the situation is this: That we have rapidly passed out, even quicker than we engineers of the railroad know, from the various kinds of near ballast that was suitable a few years ago, to practically only two kinds of ballast for 175,000 miles, comprising the largest mileage of the railroads of this country and in order to do that and do that properly, we have got to have high grade material.

"I want you men to take this home to yourselves. There are very, very few of the ballast producers today that know anything about ballast specifications, ballast classifications and ballast material. I am speaking from the standpoint of railroads. You give us what we ask for, but you are like a wet blanket laying down on the railroads to have us tell you what you should do.

"With the railroads today the standard specifications for rock and for gravel are about as wide apart as the two poles, and it is because we can't get the producers to understand that what we need on the railroads is something to do the work that I have just tried briefly to explain to you. Now it seems to me that is your job, you men are in the business, you are producing sand and gravel. Our job is trying to run the railroads.

"It strikes me that you ought to be in the same class that every other railway supply man is. I have explained to you that we are one of your big users, and it seems to me that you men ought to be the men who would come back to us and tell us what a standard specification ought to be to accomplish what we want to accomplish. Now why is it that we get poor ballast material? I is very largely due to the fact that you men either don't or won't produce it?

"You men at these conventions ought to find some way to raise the standard for first class material for railroads, because these railroads are serving you; they are your railroads. We can't handle your stuff and handle it properly and economically, we can't get the rates down where they belong until we get a good foundation. Rail and ballast are the two fundamentals of the railroad today. They have outstripped ties, they have outstripped a great many other things. Some say ballast and rail, but both are essential to a properly maintained railroad. The best material is none too good. One of the big trunk lines is hauling its material 400 miles today. One of their executive officers told me he would haul it 600 miles if it was necessary to get good material."

President Prince said that he wanted to thank Mr. Ford for one of the most stimulating addresses ever given before a convention. Some discussion followed in which Mr. Zimmerman and Mr. Shiely (both being very large producers of ballast) pointed out that specifications for ballast could not be uniform as gravels varied too widely. Some required a certain amount of sand to hold the smaller pebbles in place while others were better

without any sand. Mr. Zimmerman reported that the Association's Committee on ballast had taken up the matter with the American Railway Engineering Association which said that no gravel ballast specification would be made until 1925. The committee was continuing its work in trying to get the best gravel ballast worked out from their experience and that of the railroads.

Report on Sand and Gravel Specifications

E. Guy Sutton who represents the association with the American Society for Testing Materials gave a report on the progress that had been made. The recommendations of the associations have been adopted as tentative standards and will be published as permanent standards if they still meet the approval of the committee which has the matter in charge.

Mr. Sutton said he was very glad to know that the Association would continue its representation with the society as competing materials, especially slag and crushed stone were very active in having their materials brought to the attention of engineers.

Car Demurrage Report

T. E. McGrath, (McGrath Sand and Gravel Co.,) reported for the committee on car demurrage rules. Mr. McGrath spoke of the previous work of the association in trying to have the same demurrage rules apply equally to coal, sand and gravel and crushed stone and further remarked:

"I may state that it is well for the sand and gravel operators during these normal times to prepare for the emergencies. There is no need for an association or any activities on the part of any industry during normal times. The time that we have to prepare for is the emergencies which we all remember very well a few years ago, where the coal men were favored with cars and gravel men were wanting those same cars, and they were holding these cars on their tracks awaiting a rise in the market while the sand and gravel plants were shut down on account of lack of equipment.

"As the first step in carrying out the instructions of the membership, your committee submitted the question to the American Railway Association informally, with a view to getting an expression from this organization as to the practicability of amending the demurrage rules in the manner mentioned. We were advised that it would be necessary for us to take the matter up with the General Committee of the Transportation Division, American Railway Association, who would consider it at a hearing and would give your committee the privilege of appearing before it in support of our recommendations.

We requested a hearing, which was granted on June 12, 1924.

"On the date set your committee appeared before the General Committee and presented a formal statement, outlining fully the reasons which support our position with respect to amendment of the demurrage rules. The July issue of the *National Sand and Gravel Bulletin* published the formal statement of your committee. After the presentation of the statement, the members of the general committee made several inquiries, which were answered promptly and satisfactorily.

"On October 3, 1924, Chairman Crawford advised that our petition had been denied.

"Notwithstanding this development, your committee is of the firm conviction that

T. E. McGrath

there have been definite and tangible results from the association's prosecution of this matter. It has served to bring the transportaion problems of the sand and gravel industry to the attention of the most prominent railroad officials of the country, and we have succeeded in impressing them with our importance in the amount of business which our industry gives to the railroads annually."

Mr. McGrath explained that one reason for the denial of the petition was that coal demurrage rules are considered by a special coal committee which extends a consideration to coal not extended to other industries. He said that the sand and gravel industry had no quarrel with the coal industry as such but he did feel that the sand and gravel industry was entitled to the same transportation rights.

Two Railroad Bills Considered

The last speaker of the morning was Charles Dillon, assistant to President Markham of the Illinois Central R. R. He spoke especially of two bills which were to come before Congress this session, only two out of the 200 affecting railroads, which are before that body.

The first of these was the Howell-Barkley bill which proposes to take the place of the railroad labor board and which will create five or six boards in its place with heavy salary lists and much clerk hire. In order to save a further increase in railroad rates he advised the producers to inform themselves on the provisions of the bill and to write to their representatives and senators urging its defeat.

He asked the same action to secure the defeat of the Gooding bill, called the long and the short haul bill, initiated by communities in the inter-mountain country, who thought themselves discriminated against in favor of the Pacific coast. Unfortunately the Pacific coast rates, which these communities claimed were unfairly low, were not fixed by the railroads, but by the shipping companies over which the government exercised no control.

In closing he asked that producers should take an interest in the railroads and their problems and said it was the stockholders in railroads who had got no returns from stock who were in favor of government ownership.

This Year's Activities

President Prince next called for the report of the committee on activities for the coming year which was read by its chairman, Hugh Haddow.

"The members of the National Sand and Gravel Association produce materials prepared to meet the specification requirements of Federal, State, County and city governments. The wayside pit or temporary operator does not. He is irresponsible; his product possesses dangerous possibilities in building, whether it be highway or structure. Therefore, your Committee recommends that the work of the Association be directed primarily to promoting and extending the use of the high-grade sand and gravel produced by its members.

"That proper consideration be given to the question of car supply, demurrage, rules, minimum weights, and transportation matters of a general nature; that special attention be given to preventing, if possible, the cancellation of Kelly's Tariff 228.

"That the matter of securing more equitable compensation insurance rates be given active consideration.

"That the Executive Committee hold regular bimonthly meetings at various points throughout the United States, beginning in February We recommend that producers in the vicinity where these meetings are held be invited to attend these meetings.

"That the *National Sand and Gravel Bulletin*, which is generally recognized as the worthy and official publication of the National Sand and Gravel Association and the industry which it represents, be enlarged and its circulation increased so that its effective influence may be more widely felt.

"That the present rate of dues remain unchanged, and that a vigorous campaign be instituted for an increased membership, in connection with which the organization of local associations be encouraged.

"That this Association continue to cooperate with State and National organiza-

tions in matters which are pertinent to the success of our own industry."

The report was adopted as read without discussion.

Concrete Products Department

R. C. Fletcher (Flint Crushed Gravel Co., Des Moines, Iowa) said that he thought the time had come to establish a concrete products department. Mr. Prince spoke of the divisional meeting that had been held and suggested that the division select a chairman and that the office of the secretary be opened to such business as they cared to transact. Next year a divisional meeting will be held to consider concrete products and such other subjects as may develop.

The president thanked Rock Products for the file for 1911 containing the account of the first meeting of the association.

Resolutions

The following resolutions were adopted after being read by E. Guy Sutton, chairman of the resolutions committee:

"Whereas, there is an apparent tendency on the part of some agencies to hamper and interfere with the work and accomplishments of the Interstate Commerce Commission, the latest along these lines being the United States Bureau of the Budget, which has reduced the appropriation for the Interstate Commerce Commission for the fiscal year 1925-26 from $7,364,496 to $4,339,000, a decrease of over $3,000,00; and

"Whereas the Transportation Act of 1920 has increased the duties and responsibilities of the Interstate Commerce Commission to a tremendous degree as well as causing a decided increase in the number of complaints filed by shippers, also that the new duties required by statutory enactment at practically every session of Congress have placed added burdens on the Commission; and,

"Whereas, the delay in the decisions of the Commission today are caused by the insufficiency of the staff properly to perform the duties imposed by the Commission; and,

"Whereas, the valuation work relating to the railroads of the country is not complete, in fact has been hampered in the past by insufficient funds, and any additional curtailment of funds would be a serious blow to shippers and the Government alike, for the reason that the Commission could not proceed with this important work so closely related to the recapture clause of Section 15A of the Act to Regulate Commerce, as amended; and,

"Whereas, any denial of necessary funds would in all probability compel the Commission to dismiss many of its employees, curtail the traveling of its examiners, and thus compel the public to go to Washington to present its cases; therefore, be it

"Resolved, that the National Sand and Gravel Association is opposed to the curtailment of funds necessary to allow the Interstate Commerce Commission to perform its duties, and that the Association earnestly urges the Bureau of the Budget to reconsider its decision to decrease the allowance of the Interstate Commerce Commission for the fiscal year 1925-26; and, be it further

"Resolved, that the members of the National Sand and Gravel Association write their Senators and Congressmen asking them to influence the Bureau of the Budget along these lines."

Resolution on the Death of Edgar H. Defebaugh

"Whereas, it has pleased the Almighty to call Edgar H. Defebaugh, formerly editor of Rock Products and a man held in universal esteem by the members of this Association; now, therefore, be it

"Resolved, that the National Sand and Gravel Association in formal session at its Ninth Annual convention in the city of Chicago, Illinois, on January 7, 1925, that acknowledgment is made of the debt the Association owes to Mr. Defebaugh as the inspirer of the idea upon which the organization is founded, and the work he did in bringing about its establishment, and that it learns of his death with the deepest regret; and,

"That this resolution be spread on the permanent records of the Association and a copy sent to the members of his family."

The nominating committee than presented its report which was adopted and the following were declared elected for the ensuing year:

New Officers and Directors

President, John Prince, Stewart Sand Co., Kansas City, Mo. (re-elected).

Vice-President, Hugh Haddow, Jr., Menantico Sand Co., Millville, N. J.

Secretary-Treasurer, J. L. Shiely, of J. L. Shiely, St. Paul, Minn.

Directors at Large, Harry S. Davison, of J. K. Davison & Brother, of Pittsburgh; George Rogers, Union Rock Co., of Los Angeles, Calif.; Charles H. Miller, Allen Gravel Company, Little Rock, Ark.

For the four men to act with the three officers as the completion of the Executive Committee itself: John Settle, of the Ohio River Sand Co., Louisville, Ky.; H. H. Halliday, of Cairo, Ill.; R. C. Fletcher, of the Flint Crushed Gravel Co., Des Moines, Iowa; and Harry S. Davison, of J. K. Davison & Brother, of Pittsburgh.

After these were declared elected the convention adjourned.

Concrete Products Meeting

At the conclusion of Mr. Burke's address to the convention he invited all members who were interested in concrete products to join him in a meeting in another room. The following responded:

Thomas Folkerth, Kalamazoo - Greenville Gravel Co., Kalamazoo, Mich.
E. W. Dienhart, Acme Concrete Products and Gravel Co., Cement City, Mich.
J. L. Richmond, Union Sand and Gravel Co., Huntington, W. Va.
O. L. Britton, Lenamee Sand and Gravel Co., Tecumseh, Mich.
D. M. Filler, Urbana Sand and Gravel Co., Urbana, Texas.
N. C. Rockwood, Rock Products, Chicago, Ill.
N. D. Crowley, Albany Gravel Co., Inc., Albany, N. Y.
Floyd Goodrich, Humboldt Gravel and Tile Co., Humboldt, Iowa.
G. H. Boynton, Northern Gravel Co., Muscatine, Iowa.
E. W. Boynton, Northern Gravel Co., Muscatine, Iowa.
E. J. Stiefel, Stiefel Material Co., St. Paul, Minn.
S. E. Sharp, Hamilton Washed Sand and Gravel Co., Hamilton, Ill.
E. S. Hanson, Cement, Mill and Quarry Co., Chicago, Ill.
A. P. Burke, Atlanta Sand and Supply Co., Atlanta, Ga.
E. P. May, Union Sand and Gravel Co., Huntington, W. Va.
E. L. Huddleston, Tucker Sand and Gravel Co., Little Rock, Ark.
L. H. Allen, Hawthorne Roofing Tile Co., Cicero, Ill.
C. W. Maxwell, Albany Gravel Co., Inc., Albany, N. Y.
L. K. Warner, Marion Sand and Gravel Co., Marion, Ohio.
W. A. Wicks, Marion Sand and Gravel Co., Marion, Ohio.
C. F. Mullen, Florida Gravel Co., Cleveland, Ohio.
U. G. McGowan, Ideal Sand and Gravel Co., Mason City, Iowa.
C. E. Thomas, Ideal Sand and Gravel Co., Mason City, Iowa.

Mr. Burke, who acted as chairman, turned over the meeting to E. W. Dienhart, who spoke at length on the industry. His talk will be given in greater detail in a later issue of Rock Products.

Mr. Dienhart spoke of the sales resistance that concrete products had to meet because of being new. He told how this resistance might be overcome because through the work of the Portland Cement Association and other agencies there was not a living soul in the country who was not interested in concrete. There was also a multitude of tests which showed the efficiency and fire resistance of concrete products when laid in the wall. He gave many examples of the success of concrete products in both a technical and business way. He and Mr. Allen of the Hawthorn Roofing Tile Co. of Cicero, Ill., had done a lot of work while they were with the Portland Cement Association and this was summarized.

The latter part of his address was given up to the use of aggregates in concrete products, which, he said, was a mathematical proposition, based on the fineness modulus. If the fineness modulus of the sand was 2.5, for example, one must add sufficient coarse aggregate to bring the fineness modulus to 4.25 in order to have a satisfactory aggregate.

Mr. Allen followed Mr. Dienhart with a talk on the concrete products industry, giving figures of its growth. He said that there was nothing made of clay that could not be better made of concrete.

Registration

Joseph C. Aldous, Mississippi Lime and Material Co., Alton, Ill.
David Alexander, Petersburg Sand and Gravel Corp., Dixie Sand and Gravel Corp., Petersburg, Va.
D. M. Anderson, Empire Sand and Material Co., Wichita, Kans.
J. W. Alder, American Sand and Gravel Co., Chicago, Ill.
Leslie H. Allen, Concrete Tile Machy. Co., Chicago, Ill.
L. D. H. Anderson, Good Roads Mchy. Co., Boston, Mass.
Burton H. Atwood, Chicago, Ill.
A. O. Ayres, Eau Claire Sand and Gravel Co., Eau Claire, Wis.
Earl S. Baker and Mrs. Baker, Baker Gravel Co., Noblesville, Ind.
E. A. Baker and Mrs. Baker, Baker Gravel Co., Noblesville, Ind.
H. N. Batties, Grand Rapids Gravel Co., Grand Rapids, Mich.
Wm. H. K. Bennett, W. H. K. Bennett Co., Chicago, Ill.
Chas. P. Biesans and Mrs. Biesans, Biesans Stone Co., Winona, Minn.
J. B. Blanton, J. B. Blanton Co., Frankfort, Ky.
Louis P. Blum, Allegheny Co., Penn.
D. M. Boddington, Kansas City, Kans.
G. H. Boynton, E. W. Boynton and Miss Eleanor E. Boynton, Northern Gravel Co., Muscatine, Iowa.

H. J. Brendlin, The Hayward Co., New York, N. Y.
Edwin Brooker, Washington, D. C.
V. C. Browne, A. Leachen and Sons Rope Co., Chicago, Ill.
A. P. Burke, Atlanta Sand and Supply Co., Atlanta, Ga.
E. J. Burman, Cincinnati Rubber Mfg. Co., Cincinnati, Ohio.
R. E. Brooks, New York, N. Y.
Frank J. Billeter, Indiana Gravel Co., Indianapolis, Ind.
O. L. Brilton. Lenamee Sand and Gravel Co., Tecumseh, Mich.
Chas. A. Breskin, "Rock Products," Chicago, Ill.
H. L. Bible, Alabama Sand and Gravel Co., Montgomery, Ala.
O. E. Boice, Boice Bros., Pontiac, Mich.
E. C. Boice, Boice Bros., Pontiac, Mich.
C. B. Boone, The High Grade Sand and Gravel Co., Denver, Colo.
J. R. Bakstad, Bakstad Mchy. Co., Chicago, Ill.
A. H. Brymer, Standard Sand and Gravel Co., Clinton, Iowa.
C. J. Burlington, Hawarden Gravel Co., Hawarden, Iowa.
H. P. Caldwell, Ohio River Sand Co., Louisville, Ky.
J. E. Carroll, J. E. Carroll Sand Co., Buffalo, N. Y.
W. I. Colson, Field Secy., A. G. C. of America, Washington, D. C.
J. G. V. Clarke, Clarke Rock and Gravel Co., Los Angeles, Calif.
J. M. Chandler, Price Sand Co., Tulsa, Okla.
V. A. Cordes, Wolf River Sand Co., Memphis, Tenn.
C. W. Crisler, Potts-Moore Gravel Co., Waco, Texas.
N. D. Crowley, Albany Gravel Co., Inc., Albany, N. Y.
Norman F. Callahan, The M. A. Callahan Sand Co., Cleveland, Ohio.
Otto S. Conrades, St. Louis Material and Supply Co., St. Louis, Mo.
H. W. Christy, St. Louis Material and Supply Co., St. Louis, Mo.
W. S. Carson, W. S. Carson Sand Co., Williamsport, Penn.
J. P. Cantlon, Neal Gravel Co., Mattoon, Ill.
E. J. Campbell, Sun Sand Co., Thayer, W. Va.
Bradley S. Carr, American Manganese Steel Co., Chicago Heights, Ill.
H. D. Conkey, H. D. Conkey and Co., Mendota, Ill.
C. A. Carson, The High Grade Sand and Gravel Co., Denver, Colo.
R. N. Campsey, LeGrand Stone Co., LeGrand, Iowa.
Ralph E. Gorrett, Charlestown Sand and Stone Corp., Elkton, Md.
Alex. W. Dann, Keystone Sand and Supply Co., Pittsburgh, Penn.
H. S. Davison, J. K. Davison and Bro., Pittsburgh, Penn.
Geo. McC. Davison, J. K. Davison and Bro., Pittsburgh, Penn.
H. M. Davison, The Hayward Co., New York City
J. L. Dillard, The Strum and Dillard Co., Columbus, Ohio.
Edw. Donnelly, The Ohio Gravel Ballast Co., Cincinnati, Ohio.
R. A. Dravo, Keystone Sand and Supply Co., Pittsburgh, Penn.
H. L. Dickinson, Benton Gravel Co., Benton, Ark.
E. W. Dienhart, Acme Concrete Products and Gravel Co., Cement City, Mich.
C. S. Darling, Pennsylvania Crusher Co., Chicago, Ill.
L. E. Duvall, Sabula Sand and Gravel Co., Sabula, Iowa.
D. Dick, Jr., National Sand and Material Co., Ltd., Welland, Can.
C. G. Diggs, Charlestown Sand and Stone Corp., Elkton, Md.
R. W. Eberly, Buffalo Gravel Corp., Buffalo, N. Y.
V. B. Edwards, Keystone Sand and Supply Co., Pittsburgh, Penn.
Geo. M. Earnshaw, "Rock Products," Chicago, Ill.
O. J. Ellingen and Mrs. Ellingen, H. D. Conkey and Co., Mendota, Ill.
C. A. Elliott, U. S. Rubber Co., Chicago, Ill.
D. C. Elphinstone, Iron City Sand and Gravel Co., Pittsburgh, Penn.
D. M. Filler and Mrs. Filler, Urbana Sand and Gravel Co., Urbana, Texas.
R. C. Fletcher and Mrs. Fletcher, Flint Crushed Gravel Co., Des Moines, Iowa.
Chas. M. Freidheim, Hedberg-Freidheim Co., Minneapolis, Minn.
A. E. Frosch and Mrs. Frosch, East Liverpool Sand Co., East Liverpool, Ohio.
Thomas D. Folkerth, Kalamazoo-Greenville Gravel Co., Kalamazoo, Mich.
Robert H. Forde, C. R. I. & P. R. R., Chicago, Ill.
Wm. Frogner, Chicago Gravel Co., Chicago, Ill.
O. E. Gooding, Standard Gravel Co., Pontiac, Mich.
E. M. Gray, Des Moines Sand and Fuel Co., Des Moines, Iowa.
F. H. Gades, Wear Sand Co., Topeka, Kans.
J. A. Gunn, Des Moines, Iowa.
Floyd Goodrich, Humboldt Gravel and Tile Co., Humboldt, Iowa.
John J. Griffith (Mrs. Griffith and Mrs. Earbest Horn), Secretary and Engineer, Indiana Sand and Gravel Association, Indianapolis, Ind.
Kay M. Grier and Mrs. Grier, Blue Diamond Materials Co., Los Angeles, Calif.
Hugh Haddow, Jr., Menantico Sand and Gravel Co., Millville, N. J.
F. E. Hall, T. J. Hall Sand Co., and The Ohio River Sand and Gravel Co., Cincinnati, Ohio.
H. H. Halliday, H. H. Halliday Sand Co., Cairo, Ill.
N. R. Halliday, Halliday Sand Co., Cairo, Ill.
E. S. Hanson, Cement, Mill and Quarry, Chicago, Ill.
E. E. Hickok, A. Leschen and Sons Rope Co., Chicago, Ill.
H. E. Hopkins, Cement, Mill and Quarry, Chicago, Ill.
H. C. Huffstetter, Brown-Huffstetter Co., Indianapolis, Ind.
C. D. Huntington, Link-Belt Co., Chicago, Ill.
E. L. Huddleston, Tucker Sand and Gravel Co., Benton, Ark.
B. Haislip, Traylor Engineering and Mfg. Co., Chicago, Ill.
L. F. Hare, Wabash Sand and Gravel Co., Terre Haute, Ind.
Geo. B. Hart, Chicago Gravel Co., Chicago, Ill.
R. E. Hammond, Chicago Gravel Co., Chicago, Ill.
W. G. Harris, The Rubber City Sand and Gravel Co., Akron, Ohio.
J. H. Hock, Taylor-Wharton Iron and Steel Co., High Bridge, N. J.
Jos. A. E. Hoeveler, Iron City Sand Co., Pittsburgh, Penn.
V. O. Johnston, Lincoln Sand and Gravel Co., Lincoln, Ill.
W. E. Johnson, Missouri Valley Association, Kansas City, Mo.
Chas. E. Jefferson, Granite Sand and Gravel Co., Indianapolis, Ind.
John H. Jefferson, Granite Sand and Gravel Co., Morristown, Ind., Plant.
K. E. Kersten, Cincinnati Rubber Mfg. Co., Cincinnati, Ohio.
Robt. P. Kite, The Dorr Co., Inc., Chicago, Ill.
Otto Kuehne, Jr., Kansas Sand Co., Topeka, Kans.
A. H. Koepke, Wear Sand Co., Topeka, Kan.
Hal. S. Knight and Mrs. Knight, Rubber City Sand and Gravel Co., Akron, Ohio.
A. F. Keenan, United States Rubber Co., Chicago, Ill.
M. Kaplan, Victor Balata Textile and Belting Co., Chicago Heights, Ill.
H. J. Larkin, Rock Island Sand and Gravel Co., Rock Island, Ill.
John P. Lyons, Highway Commissioner, Brockton, Mass.
A. P. Lyvers, Brown Hoist Machy. Co., Chicago, Ill.
Robt. I. Larrimer, Larrimer and Shaffer, Cedar Rapids, Iowa.
E. C. Lemieux, Gopher Stone Co., Minneapolis, Minn.
S. W. Munday, Pit and Quarry, Chicago, Ill.
Edwin F. Mitchell, American Manganese Steel Co., Chicago Heights, Ill.
Geo. V. Miller, Granite Sand and Gravel Co., Indianapolis, Ind.
Louis McLouth, Sauerman Bros., Chicago, Ill.
Wayne A. McGowan, Ideal Sand and Gravel Co., Mason City, Iowa.
U. Grant McGowan, Ideal Sand and Gravel Co., Mason City, Iowa.
A. L. McCullum (Otto Kuehne) Topeka, Kans.
A. P. McCallie, Blue Diamond Service Corp., New York, N. Y.
Jos. R. McGaw, Ohio River Sand Co., Pittsburgh, Penn.
A. G. Macey, N. S. & G. Bulletin, Washington, D. C.
Chas. H. Miller, Allen Gravel Co., Memphis, Tenn.; Southern Sand Co., Little Rock, Ark.
T. E. McGrath, McGrath Sand and Gravel Co., Lincoln, Ill.
C. W. Maxwell, Albany Gravel Co., Inc., Albany, N. Y.
H. W. Miller, Mississippi Sand and Gravel Co., Burlington, Iowa.
W. J. McGarry, American Railway Association, Washington, D. C.
Ross W. Miller, Mississippi Sand and Gravel Co., Burlington, Iowa.
C. F. Mullen, Florida Gravel Co., Cleveland, Ohio.
Edwin P. May, Union Sand and Gravel Co., Huntington, W. Va.
E. R. Miller, Olean Sand Co., Boonville, N. Y.
B. T. Macy, Sauerman Bros., Inc., Chicago, Ill.
H. C. Miller, Keokuk Sand Co., Keokuk, Iowa.
C. Miller, Keokuk Sand Co., Keokuk, Iowa.
H. J. Miller, H. J. Miller Lumber Co., Seattle, Wash.
Geo. J. Nattkemper and Mrs. Nattkemper, Terre
Perry Nagle, American Manganese Steel Co., Chicago Heights, Ill.
Haute Gravel Co., Terre Haute, Ind.
N. V. Owens, Boonville Sand Corp., Utica, N. Y.
R. M. Pirnie, Muncie Sand Co., Kansas City, Mo.
E. J. Procter, Jr., Flint Builders Supply Co., Flint, Mich.
John Prince and Mrs. Prince, Stewart Sand Co., Kansas City, Mo.
O. A. Pechman, A. Leschen and Sons Rope Co., Chicago, Ill.
F. W. Peck and Mrs. Peck, Muncie Sand Co., Kansas City, Mo.
Robt. J. Potts, Potts-Moore Gravel Co., Waco, Texas.
J. F. Poland, Brown Hoisting Mchy. Co., Cleveland, Ohio.
E. J. Procter, Genesee Gravel Co., Mt. Morris, Mich.
James F. Powers, Powers Bros., Brockton, Mass.
Melvin C. Pohlkotte, Mohawk Gravel Co., Mohawk, Ind.
Geo. A. Paige, Link-Belt Co.
G. C. Ross, Ohio River Gravel Co., Parkersburg, W. Va.
W. E. Rogers and Mrs. Rogers, Arkansas River Sand Co., Tulsa, Okla.
Nathan C. Rockwood, "Rock Products," Chicago, Ill.
J. W. Reed, Cincinnati Rubber Mfg. Co., Cincinnati, Ohio.
Lloyd Reitman, The Hallock Sand Co., Columbus, Ohio.
W. C. Roberts, Yourtee-Roberts Sand Co., Chester, Ill.
R. N. Risser, Pit and Quarry, Chicago, Ill.
W. H. Rucker, New Hope Gravel Co., Columbus, Miss.
F. W. Renwick, Chicago Gravel Co., Chicago, Ill.
E. W. Renwick, Chicago Gravel Co., Chicago, Ill.
J. L. Richmond, Union Sand and Gravel Co., Huntington, W. Va.
H. E. Schellberg and Mrs. Schellberg, Lyman-Richey Co., Omaha, Neb.
N. Snoddy and Mrs. Snoddy, Coon River Sand Co., Des Moines, Iowa.
G. H. Smith, Albany Gravel Co., Inc., Albany, N. Y.
J. M. Settle, Ohio River Sand Co., Louisville, Ky.
W. L. Smith, Memphis Stone and Gravel Co., Memphis, Tenn.
E. J. Schillinger, A. Leschen Sons Rope Co., Chicago, Ill.
H. B. Springer, Dixie Sand and Gravel Co., Chattanooga, Tenn.
Edmund Shaw, "Rock Products," Chicago, Ill.
J. L. Shiely and Mrs. Shiely, J. L. Shiely Co., St. Paul, Minn.
Stephen Stepanian, The Arrow Sand Co., Columbus, Ohio.
E. Guy Sutton and Mrs. Sutton, Neal Gravel Co., Mattoon, Ill.
E. J. Stiefel, Stiefel Material Co., St. Paul, Minn.
Roy G. Smock and Mrs. Smock, Cedar River Sand and Material Co., Waterloo, Iowa.
Charles A. Smith, J. K. Davison and Bro., Pittsburgh, Penn.
Jesse A. Shearer and Mrs. Shearer, Indiana Gravel Co., Indianapolis, Ind.
Ben Stone, Merom Gravel Co., Merom, Ind.
I. P. Steinberg, Neal Gravel Co., Mattoon, Ill.
P. A. Stewart, Kickapoo Sand and Gravel Co., Peru, Ind.
A. W. Sergeant, Rochester, N. Y.
W. H. Symes, Marion Sand and Gravel Co., Marion, Ohio.
H. J. Stannert, H. J. Stannert Sand Co., Northumberland, Pa.
A. K. Schifflin, Northern Gravel Co., West Bend, Wis.
Glenn Sitterly and Miss Ada Sitterly, Western Sand and Gravel Co., Spring Valley, Ill.
D. R. Snyder, Abe Hart, Sanborn, Ind.
Arthur O. Schoo, E. T. Slider, New Albany, Ind.
Walter L. Slider, E. T. Slider, New Albany, Ind.
E. L. Schwaderer, Cass City Sand and Gravel Co., Cass City, Mich.
E. B. Schwaderer, Cass City Sand and Gravel Co., Cass City, Mich.
James J. Scully, The Scully Co., Boston, Mass.
S. E. Sharp, Hamilton Washed Sand and Gravel Co., Hamilton, Ill.
G. C. Shaffer, Larrimer and Shaffer, Cedar Rapids, Iowa.
Geo. H. Schneider and Mrs. Schneider, Schneider Sand and Gravel Co. (Duvall), Clinton, Iowa.
R. M. Swanson, Galesburg Sand and Gravel Co., Galesburg, Ill.
W. H. Storer, Iron City Sand Co., Pittsburgh, Penn.
H. L. Smith, Kirkpatrick Gravel Co., Greenfield, Ind.
C. E. Thomas, Ideal Sand and Gravel Co., Mason City, Iowa.
G. H. Tompkins, Sauerman Bros., Inc., Chicago, Ill.
H. B. Thompson, American Sand Co., Kansas City, Mo.
Chas. Thurlby, Lenawee Sand and Gravel Co., Tecumseh, Mich.
J. B. VanValkenburgh, Huntsville Transfer and Building Material Co., Huntsville, Ala.
J. W. Van Brunt, Jackson and Church Co., Saginaw, Mich.
H. A. Von Unwerth and Mrs. Von Unwerth, Yahola Sand and Gravel Co., Muskogee, Okla.
Geo. Vang, Iron City Sand Co., Pittsburgh, Penn.
R. L. Wilkinson, Cincinnati Rubber Mfg. Co., Cincinnati, Ohio.
F. R. Wilman, Cincinnati Rubber Mfg. Co., Cincinnati, Ohio.
E. E. Woodson, Muncie Sand Co., Kansas City, Mo.
Prof. S. N. Williams, Mt. Vernon, Iowa.

Geo. S. Wehrwein, Madison, Wis.
Geo. H. Williamson, J. K. Davison and Bro., Pittsburgh, Penn.
Lee R. Witty and Mrs. Witty, Wabash Sand and Gravel Co., Terre Haute, Ind.
J. H. Wagoner, Boonville Sand Corp., Boonville, N. Y.
H. S. Wright, Portland Cement Association.
L. K. Warner, Marion Sand and Gravel Co., Marion, Ohio.
C. S. Wert, C. S. Wert, Kendallville, Ind.
G. A. Whitney, Whitney Bros. Co., Duluth, Minn.
John Wunder, John Wunder Co., Minneapolis, Minn.
C. M. Young, Cincinnati Rubber Mfg. Co., Cincinnati, Ohio.
P. A. Yager, River Sand and Gravel Co., Owensboro, Ky.
Chas. H. Young, Robbins, Young Co. and Landers, Morrison, Christenson Co., Minneapolis, Minn.
D. V. Yeoman, Warsaw, Ind.
R. C. Yeoman, Con. Mat. Co., Chicago, Ill.
Earl Zimmerman, The Ohio Gravel Ballast Co., Cincinnati, Ohio.

Lyman-Richey Sand Company to Build Another Plant

GEORGE D. Schellberg of the Lyman-Richey Sand Company, of Omaha, was in Bridgeport, Neb., recently inspecting the transmission lines, plants and other parts of the Western Public Service Company's property, relative to furnishing electricity to a proposed large sand and gravel plant of the Lyman-Richey Sand Company, near Bridgeport.

After completing the inspection, he signed a power contract for 110 horsepower, to be furnished to the new sand and gravel plant on March 1, 1925.

Mr. Schellberg stated that his company is operating many sand and gravel plants along the Platte river, using oil engines, steam engines and electricity, and prefers at all times to use electric motors, if it can purchase dependable electric service at reasonable and fair rates. This policy caused him to select Bridgeport as the best location for the enlarged plant, in view of the fact that his company cannot purchase electricity in central Nebraska at rates satisfactory to it, and is forced to use steam engines.

The plant here will be able to prepare and ship 16 to 20 car loads a day, and with the cheap production costs, the sand and gravel can be shipped a distance of 250 miles from Bridgeport and the prices compete with those of other companies.—*Bridgeport (Neb.) Herald.*

Telsmith Gravel Plants

Smith Engineering Works, Milwaukee, Wis., has issued a bulletin, No. 268-A, that will interest every sand and gravel producer. It is not a catalog in the ordinary sense of the word, but is wholly devoted to designs of sand and gravel plants. Almost all of these are published in this bulletin for the first time and were prepared especially for it. The various designs are such as would be adapted to large or small productions and also to variations in the ground due to grade or to limits of the space available for building of a plant. This manual was issued as a companion to the bulletin on quarry plant layouts recently issued.

The Right Kind of Advertising to Sell Sand—or Any Other Aggregate

CLARENCE F. PRATT, better known as "Sandy" Pratt the length of the Pacific coast, is the clever advertising man who went into the crushed stone and sand and gravel business. You may read of his work at greater length in the January 12, 1923, issue of ROCK PRODUCTS.

Clarence F. Pratt

By good advertising he not only built up a big business but also secured the capital necessary to buy new deposits and enlarge his business. His latest advertising stunt is based upon so sound a knowledge, both of the sand business and the proper way to appeal to the buyer, that it will interest every producer of mineral aggregate.

He sent a letter to everyone on his mailing list and enclosed a small sample of sand. The sample was marked, "Screened American River Sand, Shipping Point, Sacramento, Pratt Building Material Co.," and the letter read:

Dear Sirs:

We enclose sample of our NEW WASHED AMERICAN RIVER SAND.

A few days ago we installed a Log Washer at Sacramento, which absolutely removes all clay, silt, decomposed leaves, twigs, etc., and should you want a hundred carloads of our American River Sand, the hundred cars would be just like this sample, clean, sharp and coarse.

The October rains have been quite heavy on the upper waters of the American River, so that the American is now flowing quite a stream. This rise of the river has brought in new clean sand and plenty of it.

You know that we have always washed American River Sand twice—first in the revolving screen, and then a second time in the drying tanks, but now we give it a third washing with our new Log Washer. Formerly some of the dirty water was used to wash the sand in the drying tanks, but now the new Log Washer picks up all the silt, twigs, dirt, etc., which, with the muddy water, flow in another direction. Consequently, nothing but clean water washes the sand (already twice washed) in the drying tanks.

When you order river sand for plastering, brick mortar or concrete, don't say "send me river sand" but insist on "Pratt's washed American River Sand," because it is washed three times, besides being screened.

"I thank you,"
"SANDY" PRATT.

The sand is exceptionally clean. Even when moistened it will not stain white paper. A good sample is always good advertising, but backed with a letter of this kind it becomes an irresistible argument for buying just the kind of sand in the sample, and no other.

There are producers—and some big ones—who believe it is useless to advertise sand or crushed rock. They say it is impossible to create a demand for any more material than is being used, or that will be used. But this argument is beside the point. The increase in demand takes care of itself. It is the man who knows how to apply to methods of good salesmanship and advertising who gets his share of the increase.

New Illinois Gravel Plant

V. B. ASHELFORD AND SONS are erecting a sand and gravel plant just north of Byron, Ogle county, Illinois. The foundation is 18x60 ft. with three walls carried the full length and 11 ft. high. On these is a reinforced floor 18 in. thick, on which five bins are being erected. These will hold about 20 cars.

The gravel is dug by a slackline cableway with a 1½-yd. bucket which works over a 600 ft. span. The mast is 90 ft. high. The material is raised 70 ft. and dropped into a hopper covered with a grizzly. The oversize falls to a jaw crusher and then to the main screen along with the undersize. The screen will make two sizes of gravel and two of sand.

Water for washing is pumped from a well supplied from Rock river. The plant will be completed early in the coming spring.

An Outline of Gypsum Production

Description of the Principal Processes Employed with Costs of Both Plant Construction and Operation

By J. L. McK. Yardley

General Engineer, Westinghouse Electric and Manufacturing Co., Formerly Chief Engineer, The Beaver Board Companies

TO have a thorough appreciation of gypsum products, the methods of manufacture and the industrial applications, it is necessary to understand something of the various forms in which calcium sulphate appears in nature, of which gypsum is one. There are two common forms:

Gypsum .....$CaSO_4.2H_2O$
Natural anhydrite .....$CaSO_4$

There are also two double salts which are less common:

Syngenite .....$CaSO_4.K_2SO_4.H_2O$
Polyhalite.....$2CaSO_4.MgSO_4.K_2SO_4.2H_2O$

Gypsum has many commercial uses, whereas anhydrite has very few, and as most gypsum contains some anhydrite, where it acts as a "poison," a great deal of the technology in the mining and milling of gypsum is concerned with the determination of and elimination of this material.

Editor's Note

IT is rare that a journal has the opportunity to present its readers with such a concise description of an industry as is given here. The inclusion of figures of cost, both of construction and operation, gives it a greater value to the reader than many pages of description.

It is an interesting thing that wherever the best gypsum is found it is almost always at a depth of about 100 ft.

Forms of Gypsum

Gypsum usually contains small percentages of SiO_2, Fe_2O_3, $CaCO_3$ and $MgCO_3$. Impure earthy gypsum containing appreciable percentages of SiO_2 is called gypsite, and this is found satisfactory in many commercial applications where pure white color is not essential. In the gypsum industry there are, however, four crystalline forms in which calcium sulphate is found, well defined. These are:

Gypsum .....$CaSO_4.2H_2O$
Calcined gypsum or hemihydrate .....$CaSO_4.\frac{1}{2}H_2O$
Soluble anhydrite.....$CaSO_4$
Natural anhydrite.....$CaSO_4$

Gypsum in the natural form is used as land plaster and as a retarder in portland cement. The hemihydrate or calcined gypsum, commonly called plaster of paris, is made by calcining gypsum at about 140 deg. C. or 284 deg. F. This material is used in many ways in the building industry, as wall plaster, moulding plaster, etc. and in the manufacture of plaster board and gypsum wall board. Soluble anhydrite, known as second settle stucco, is made by calcining gypsum at about 200 deg. C. or 392 deg. F.; but owing to its instability this material must be used immediately after calcining. This product is employed in flooring plaster and hard finish plaster and sometimes in making partition tile. This tile, which is composed of 97 per cent of gypsum and 3 per cent of wood fibre, is made in length 30 in., height 12 in., and thickness 1½ or 2 in. solid, or from 3 in. to 6 in. hollow. Owing to its value as a fireproofing material and

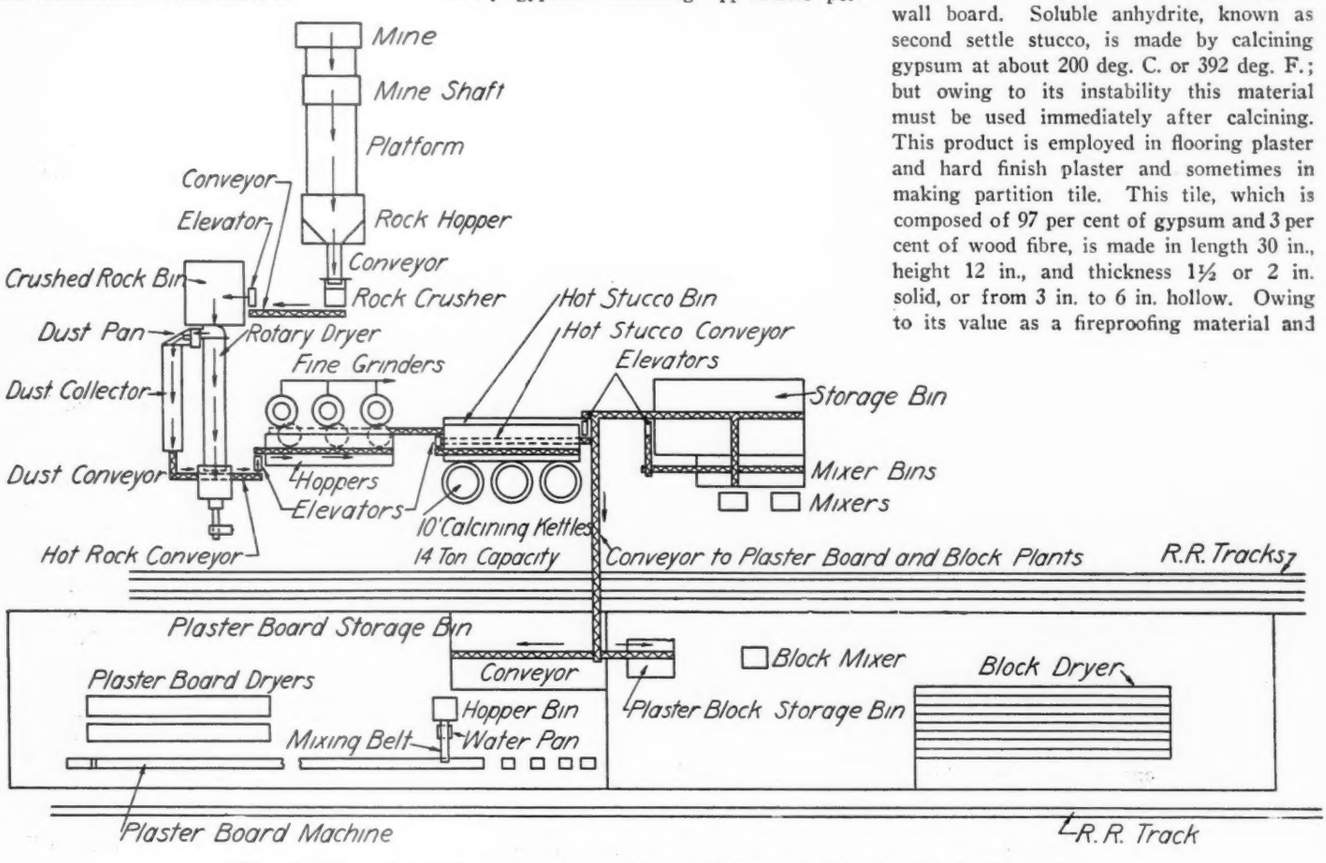


Fig. 1—Flow sheet of a gypsum operation including calcining by the kettle system

also for its sound-proofing qualities, gypsum tile is widely used. Natural anhydrite takes up water very slowly to form gypsum and has few uses at present, though it is sometimes employed as a filler in paints. A product similar to natural anhydrite may be prepared by heating gypsum at about 600 deg. C. or 1112 deg. F. for several hours.

Briefly, the commercial process of production revolves around the finding of a sufficiently pure gypsum which may be calcined to the hemihydrate, $2(CaSO_4.2H_2O)=(CaSO_4)_2.H_2O+3H_2O$), at a temperature which does not permit formation of the soluble anhydrite, that is, below 400 deg. F., which when mixed with water will take it up, reverting to gypsum, and set rapidly.

Calcium sulphate is a widely disseminated substance, but it is indeed interesting, as already mentioned, that wherever marketable gypsum is found it is at a depth of approximately 100 ft. At greater depths, increasing percentages of the natural anhydrite intrude and render the material valueless. Owing to the effect of this in shortening the life of mines and increasing the operating costs, the U. S. Bureau of Mines proposes to determine if there is not some practicable commercial method for hydration of anhydrite to gypsum or hemihydrate, thus permitting the use of gypsum rock found at greater depth. It will probably be a long time before any favorable conclusions will be obtained. At lesser depth, gysite is found, which, as mentioned, does have commercial value.

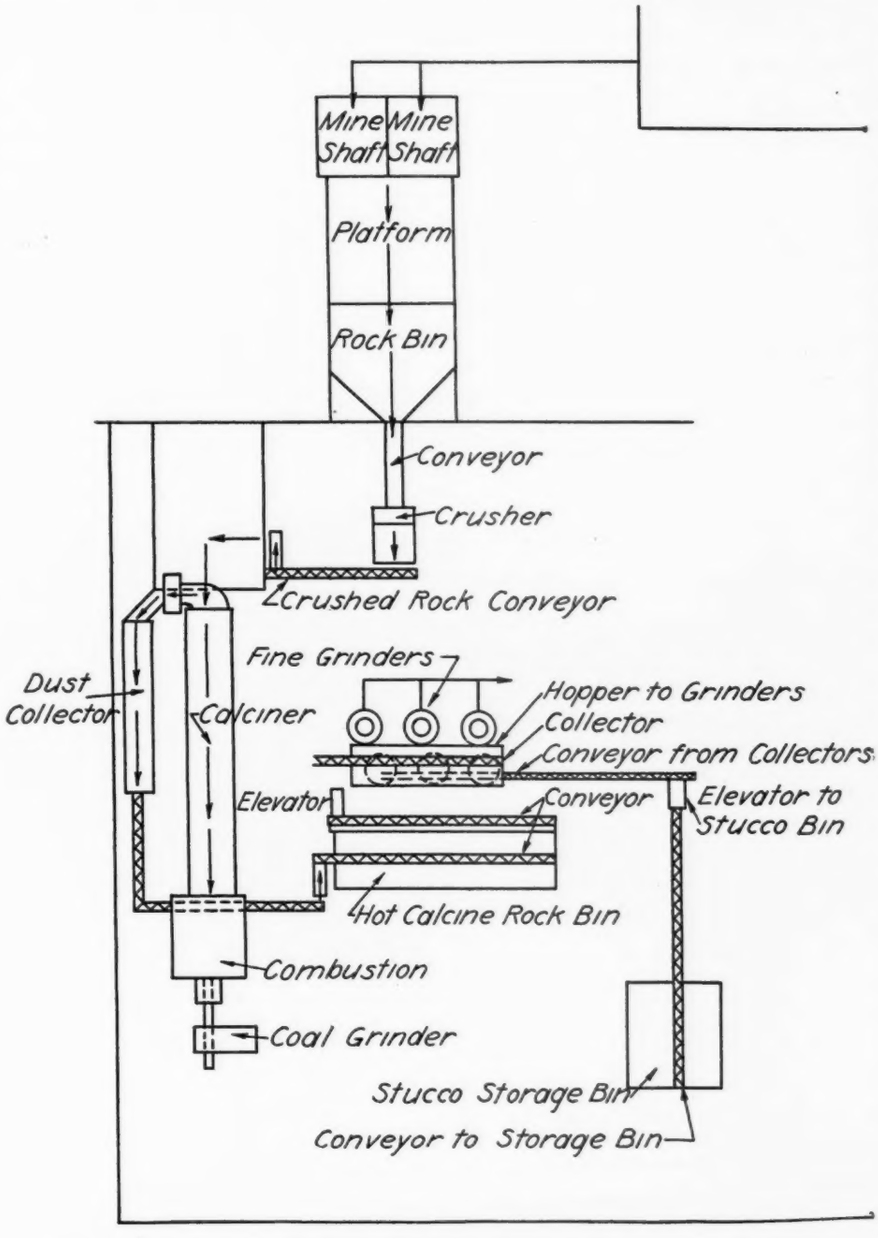


Fig. 2—Flow sheet of gypsum operation, showing rotary continuous process

The finding of commercial gypsum is not by any means easy, for no really satisfactory method of chemical analysis has been developed which will determine how much of each form is present and it is necessary to resort to microscopic methods to distinguish the different forms. This requires a knowledge of microscopic optical mineralogy beyond the command of the ordinary chemist, so that often there is a great deal of cutting and trying which is very costly to the unlucky or insufficiently financed operator, particularly as a quality product is so dependent upon uniformly pure raw material.

However, the fact that gypsum is mined at a depth of only 100 ft. and in veins of several feet thickness renders the mining of it rather a simple and inexpensive operation as compared to most other mining operations. It is probably more like soft coal mining, without most of the coal mining hazards, than anything else. A few mines use electric haulage, but most of them depend upon horses or mules. Electrical rotary drills are used, having been adapted from those used in the coal industry for special use on gypsum. The rock is shot with non-staining low grade dynamite, to assure pure color in the finished product. It is then reduced to one-man-size lumps and in this form is hauled out of the mine to be crushed and calcined. It weighs about 130 lb. per cu. ft. and has a specific heat of .2. About 15 or 16 lb. of water are driven off from every 100 lb. mined, leaving 84 or 85 lb. of calcined gypsum. The mining cost is usually somewhat less than $2.00 per ton; the cost of stucco somewhat less than $4.50 per ton and the total manufacturing cost of plaster board $16.00 to $18.50 per thousand sq. ft. The costs for a number of widely separated properties during the year 1920 is shown by Table I:

There is undoubtedly opportunity for much good consulting engineering service in this industry in cutting down costs. The detailed cost analysis that is given in Table II, covering the gypsum plant, is indicative of analyses which have been made on many properties with this end in view. Such analyses indicate frequently just where and how changes should be

TABLE I. 1920 MINING AND MILLING COSTS—GYPSUM

Property location	Tons Mine Supply	Yearly Mill Capacity, Tons of Stucco	Mine Cost, Rock	Milling Cost, Stucco	Replacement Value, Mill & Equipt.	Developm't Value of Mine
1—Southwest	7,500,000	75,000	$ .40	$2.89	$150 000	$ 15,000
2—Eastern States	300,000	100,000	2.20	4.56	200,000	75,000
3—Middle West	10,000,000	75,000	1.39	3.78	75,000	50,000
4—Middle West	1,500,000	100,000	1.69	4.02	300,000	100,000
5—East Central	2,500,000	100,000	1.89	4.49	250,000	100,000
6—East Central	600,000	75,000	1.89	4.29	175,000	75,000

made in plant, equipment or personnel.

In general, there are two different systems in use in the milling of mined gypsum for the manufacture of plaster of paris. These are the "kettle system" and the "rotary continuous system". In the manufacture of plaster of paris the gypsum rock is first crushed and ground and then calcined and finally pulverized, after which the retarders are added. Where the kettle process is employed the pulverizing is done before calcining, but where the rotary continuous process is used, the pulverizing is done after the calcining. The process chart for the rotary continuous system is shown in Fig. 2. The principal steps are described as follows:

The rock is mined and dumped into the rock hopper. It is conveyed to the crusher and crushed to 1 in. cubes and finer. It is then conveyed to the rotary hopper and from thence to the rotary calciner. The rock is calcined by direct heat, being heated to from 350 deg. to 400 deg. F. The reason for the difference in the temperature at which the rock leaves the rotary lies in the quality and kind of rock and the kind of finish plaster desired. A fan draws the moisture out at the cold end of the rotary calciner. The dust settles out in the dust separator and is conveyed to the hot rock conveyor and mixed with the hot rock, while the moisture laden gas is discharged into the air through the stack at the end of the dust separator.

When the crushed rock gets to the finishing end of the rotary calciner, it is discharged into the hot rock conveyor where a recording thermometer records the temperature of the rock as it enters the conveyor. The calcined rock is conveyed and elevated into the hot rock calcining bin where the rock remains from 12 to 36 hours to cool and complete the calcining process. The remaining moisture is here driven off and discharged through pipes which are connected through flues to the stack at the top of the calcining bin. When the rock is cooled in the calcining bin it is more uniformly calcined than when it runs direct from the rotary to the grinders. This bin is built of vitrified brick or concrete so that it will not take fire or absorb moisture from the gypsum. The calcined rock is taken out of the calcining bin at the bottom by a conveyer and elevated into the fine grinder hoppers. It then goes to the Raymond impact pulverizers where the calcined rock is ground to a finished stucco of which 95 per cent will pass through a 100 mesh sieve and is conveyed to the stucco storage bin from which it is taken to the mixed plaster bin or to the plaster board mill.

For the kettle system, as shown by the process chart, Fig. 1, the mined rock loaded on cars is brought up on the mine cars to the rock bin platform and dumped into the rock crusher bin and then conveyed to the rock crusher where it is crushed to 1 in. cubes and finer. The fine and coarse rock are conveyed together. The crushed rock is conveyed and elevated to the rotary dryer hopper and from there conveyed to the rotary dryer. When the rock goes through the dryer it is partly calcined and requires less heat to finish calcining in the kettles. From the rotary dryer the rock is conveyed and elevated into the fine grinding hopper and from the hopper it is conveyed to the fine grinders. From the fine grinders the finely ground material is conveyed to the kettle bin and from there it is conveyed into the calcining kettles where it is calcined into finished stucco. The calcining kettles will calcine from 14 to 16 tons at one batch in about an hour and a half. At the end of this time the gate is opened

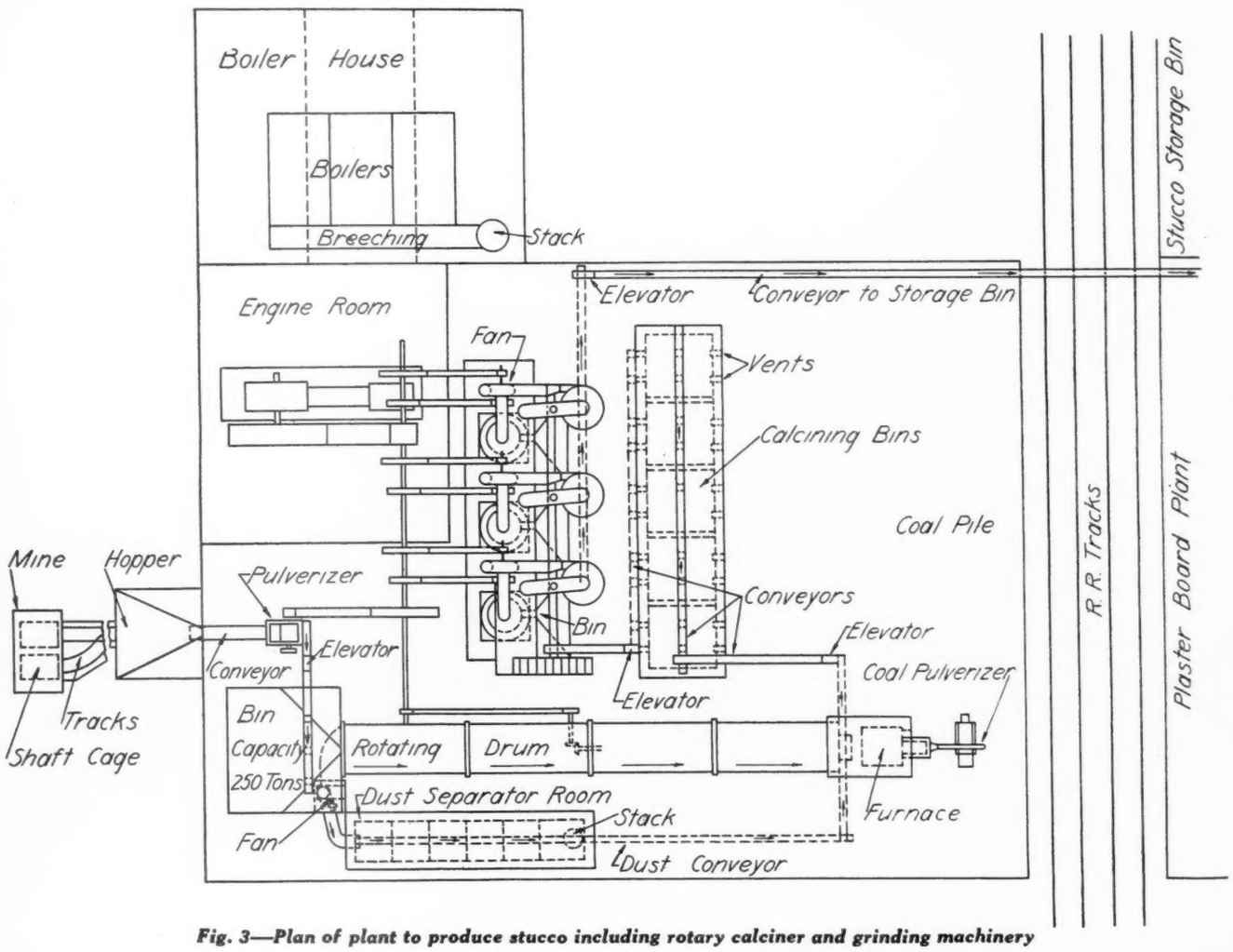


Fig. 3—Plan of plant to produce stucco including rotary calciner and grinding machinery

and the stucco runs into the hot stucco bin, where it is in the form of finished stucco or plaster of paris. From the hot stucco bin the stucco is conveyed and elevated to the storage, mixing, block or plaster board bins. Stucco conveyed direct from the hot stucco bin to the plaster board or block bins and used while warm is more satisfactory for making plaster board and blocks. The hot stucco can be conveyed direct to the Broughton mixer bins and mixed into mixed goods such as hard wall or cement plaster and wood fibre plaster, but it is better to have the stucco cooled off a little for mixed goods.

The preferred structure for a gypsum mill consists of steel framing, columns, trusses, purlins, etc.; exterior walls of 2 inches of cement plaster on metal lath; floors and foundations of concrete; roof covered with corrugated asbestos or similar material; windows provided with steel sash with ventilating unit operated by gear control. The following cost estimates are provided on a 1919 basis to indicate what may be expected when costs are down.

TABLE II. DETAILED COST ANALYSES OF GYPSUM PLANT MADE ON MANY PROPERTIES

COST OF GYPSUM MILL ON KETTLE SYSTEM TO PRODUCE 25 TONS PER HOUR, THAT IS 600 TONS PER DAY

Machinery

1—Jeffry crusher	$ 3,500.00
1—7x60-ft. rotary dryer	14,000.00
3—4-roll Raymond grinders	22,000.00
3—10x10-ft. calcining kettles	18,000.00
6—Elevators and conveyors	2,400.00
Belting, shafting, and pulleys	10,000.00
Motors and wiring	8,600.00
Miscellaneous	2,000.00
	$ 80,500.00

Building—Power Equipment

Bldg. with stucco bin for kettle system	$ 80,000.00
Building for power machinery	9,500.00
540 hp. required—engine, boiler, chimney, foundation, piping, etc., with capacity provided for mixing plant	35,000.00
	$124,500.00

Mixing Building

2—Broughton mixers	$ 3,200.00
1—Hair picker	175.00
Scales, trucks, etc.	800.00
Motors and wiring	2,400.00
Building	33,000.00
Belting and miscellaneous	2,600.00
	$ 42,175.00
Total	$246,675.00

COST OF GYPSUM MILL ON ROTARY CONTINUOUS SYSTEM TO PRODUCE 20 TONS PER HOUR

Machinery

1—Rock crusher	$ 2,800.00
1—80-ft. rotary kiln	16,028.00
4—Elevators	908.00
7—Conveyors	1,580.00
1—Powdered coal pulverizer	3,000.00
1—Combustion chamber	2,340.00
1—Dust collector	2,000.00
1—Stack	175.00
1—Fan	350.00
2—Raymond pulverizers	15,000.00
Belting, shafting, and pulleys	10,000.00
Motors and wiring	8,600.00
Miscellaneous	3,000.00
	$ 65,781.00

Building—Power Equipment

Main building	$ 40,000.00
Stucco bin 1000-ton capacity	7,500.00
Addition for boiler room and power equipment—400 hp. required	9,500.00
Engine, boiler, chimney, foundations, piping, etc., with capacity to provide for changing over to kettle system	35,000.00
	$ 92,000.00
Total	$157,781.00

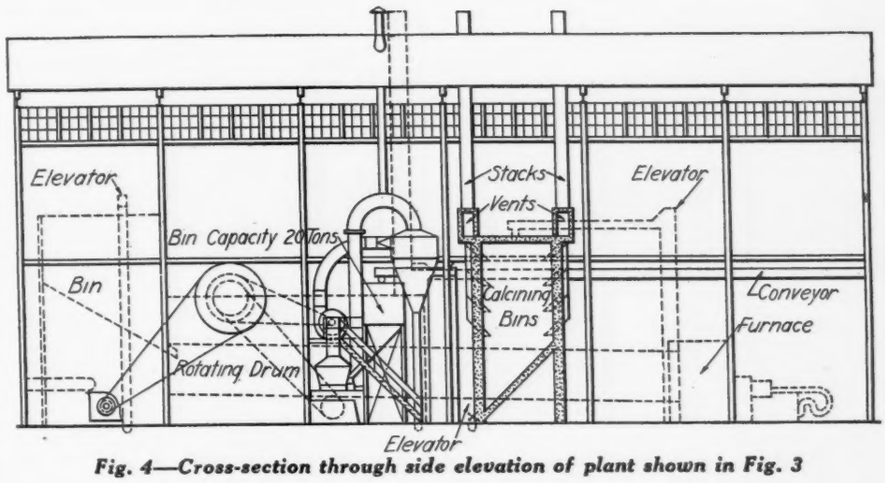


Fig. 4—Cross-section through side elevation of plant shown in Fig. 3

ESTIMATED COST OF MINE SHAFT AND EQUIPMENT

Mine shaft, 125 ft. deep	$ 4,665.50
Concreting shaft walls	8,325.00
Two mine shaft cages	1,200.00
Steel guides, etc.	220.00
Shaft housing	500.00
Platform from mine shaft to bin	800.00
	$ 15,710.50
Hoisting drums	$ 2,700.00
Motor and wiring	1,250.00
Two electric mine drills, cable, sheaves	1,300.00
20 ton mine cars	1,600.00
1000 ft. of track	589.80
Miscellaneous	5,000.00
	$ 12,889.80
	$ 28,600.30

This is merely the cost of opening the mine for operation. As seen by the figures of Table 1, the development value of a fully developed mine is considerably higher.

Fig. 3, is a plan view of a gypsum calcining plant on the continuous rotary calcining bin system described in connection with Process Chart, Fig. 2. Figs. 4 and 5, showing details of the construction and equipment which have been described, are cross sectional views of this plant, Fig. 4 is a cross-section through the side elevation; Fig. 5 is the end section. The side elevation view gives an indication of the external appearance of the main building.

With reference to possible improvements in the rotary continuous system, while the kiln may not be a very good application for waste heat boilers, as the finishing temperature is too low, owing to the relatively low temperature at which the process is conducted, some lessons might be learned from the cement industry in which similar kilns are very largely employed. Before waste heat boilers were introduced, 95 lb. of coal were required per 380 lb. bbl. in the burning of cement. Afterwards, the 95 lb. of coal also furnished steam for mechanical power equivalent to 40 lb. of coal, which in general, is sufficient to run the mill since from 13 to 19 KWH. per bbl. are required in grind-

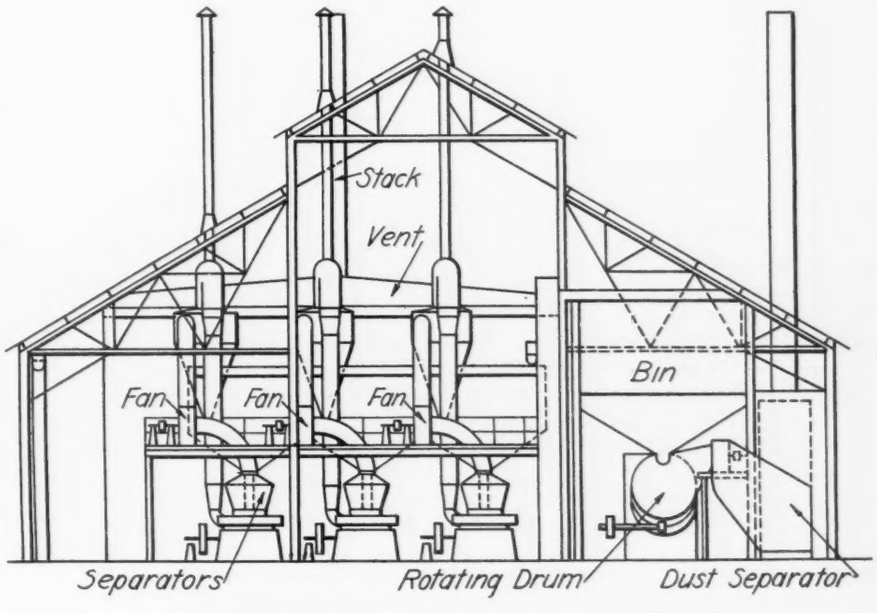


Fig. 5—End section through plant shown in Fig. 3

ing, leaving 55 lb. for the burning of the cement. Heat insulation on the kiln raised the temperature of the flue gas 150 deg. F. or where waste heat boilers wer not installed, cut down the coal consumption 5 to 10 lb. per bbl. In other words, in the cement industry 4 lb. of cement are produced per lb. of coal burned.

Fortunately, the fuel requirements in the production of gypsum, that is, plaster of paris, are only about one-half those for cement, owing largely to the considerably lower temperature. This is determined in the following way. Assume an

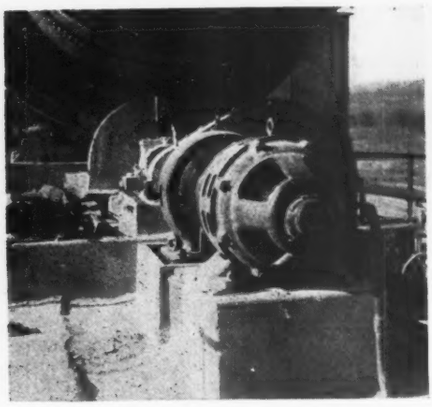


Fig. 6—A 50-hp. motor driving rotary kiln through reduction gearing

output of 506 ton per day of plaster of paris, there will be required from the mine 600 ton per day of gypsum. Then:

$2(CaSO_4.2H_2O) = (CaSO_4)_2.H_2O + 3H_2O$
Mol.wts. $2(172.2) = 2(145.2) + 3(18)$
tons $600 = 506 + 94$
Heat of formation $2(265,410)$ + fuel heat $= 2(269,660)$

That is, for 290.4 kg. of plaster of paris, there are required 8500 calories.

Accordingly, for 506 tons there are required	53,400,000 Btu.
To convert 94 tons of water to steam	182,300,000 Btu.
To raise 600 tons gypsum to 300 deg. F.	72,000,0000 Btu.
	307,700,000 Btu.

With efficiency around 25 per cent, and 12,500 Btu. coal, 50 tons of coal per day are required, or 10 lb. of plaster of paris are obtained per lb. of coal burned. The power required for grinding is also very much less than for cement, a 600 ton per day output requiring only 500 or 600 h.p. As shown in Fig. 1 the grinders have usually been steam driven through belts. Fig. 6 is a view of a 50 h.p. motor driving one of the rotary kilns through reduction gearing. Fig. 7 is a view of a similar application, a 40 h.p. motor driving a rotary dryer kiln and a screw conveyer.

Referring to the kettle system, the kettle might make a good electrification problem. The temperature required is well within the limits of commercial heating elements and the uniformity of temperature control obtainable should make operation easier and the life of the kettle appreciably longer. As at present constructed, the kettle consists of a steel cylinder set in brick work. The bottom is made of cast iron and is convex in shape. It is ¾ in. thick at the edges and 4 in. at the crown. This kettle is the part which has required the most bottom frequent repairing as would be expected owing to the inequalities of fuel firing. Efforts have been made to equalize the temperature by

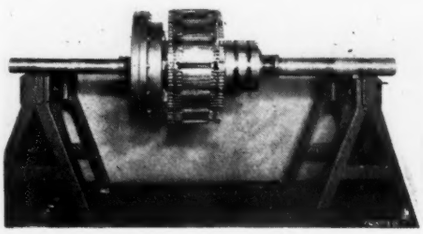


Fig. 8—Rotor showing magnetic clutch at the left, regular synchronous motor rotor in the center, and three collector rings at the right

providing from 2 to 4 flues, 12 in. in diameter, placed horizontally about 8 in. above the crown of the kettle bottom and separated externally about 6 in. The brick work surrounding the kettle allows the heated gas from the fuel fire to rise around its sides and pass out through the flues. The top of the kettle is covered with sheet iron having a movable door and a vent for the moisture to pass off. Two or three kettles are usually constructed side by side in a bank and while one is working the other is being charged or discharged. The material in the kettle is continually agitated to prevent its becoming overheated in spots and to further save the kettle bottom. The stirrer, either in the form of paddles or a chain attached to a cross-arm, drags along the kettle bottom at about 15 or 20 revolutions per minute and throws the material towards the center of the kettle. About 15 or 20 h.p. is required to drive the stirrer.

This industry would also appear to be a

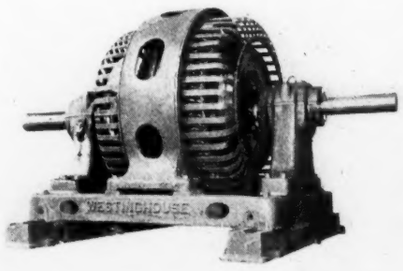


Fig. 9—A 150-hp. 400-r.p.m. synchronous motor of the magnetic clutch type

good application for the new type of self-contained magnetic clutch, synchronous motor for the main mill drives where electrical power is generated or purchased. This type of motor as shown by cross-sectional view, Fig. 10, has been especially developed for use in the cement industry and similar industries were high starting torque is required and high power factor is desirable. Fig. 9 is a view of an assembled 150 h.p. 400 rpm. synchronous motor of this magnetic clutch type having double shaft extensions, and Fig. 8 is

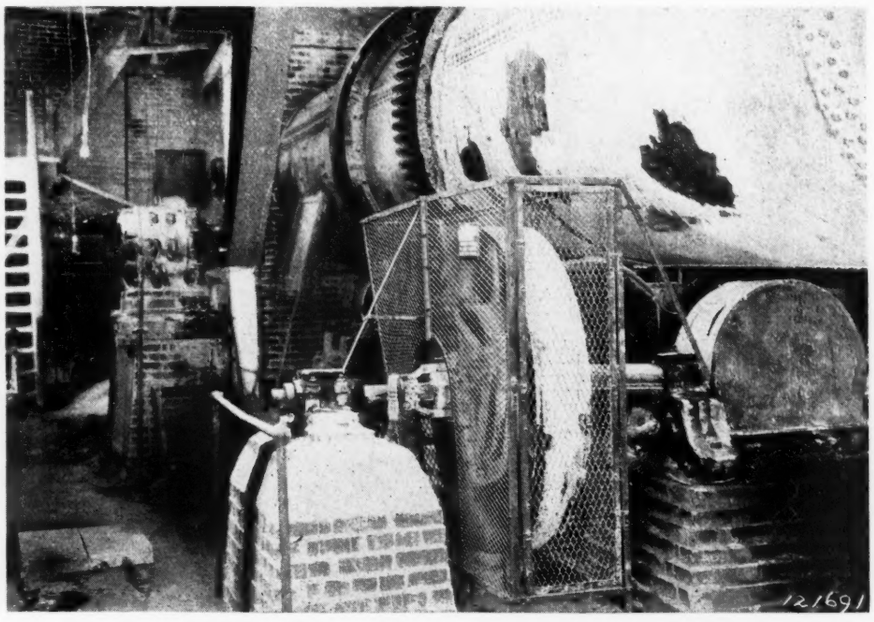


Fig. 7—A 40-hp. motor driving a rotary dryer kiln and a screw conveyor

a view of the rotor showing the magnetic clutch to the left, the regular synchronous motor rotor in the center and the three collector rings at the right for excitation of the clutch and the synchronous motor field windings. By having the rotor free

to rotate upon the shaft, it starts easily and then by exciting the magnetic clutch, a load may be started far in excess of the full load capacity of the motor, in fact, any load less than its pullout torque. Several of these motors or one similar but of larger capacity could be substituted for engine drive with advantage in many cases.

A considerable part of the output of gypsum calcining plants is now going into the manufacture of plaster board and gyp-

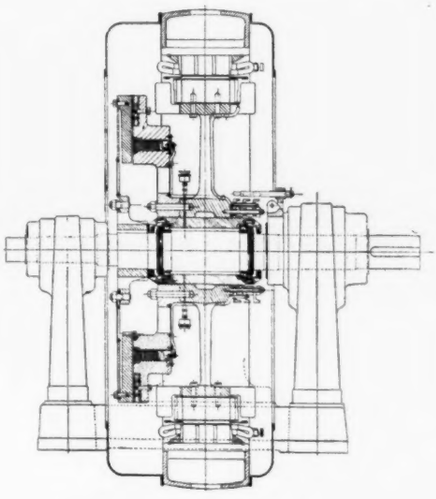


Fig. 10—Cross-section of motor

sum wall boards, which are being increasingly appreciated in the building industry. Cross sections of various forms of gypsum wall boards, which have been manufactured are shown in Fig. 11. In this manufacture, plaster or stucco, water and fibre, are mixed mechanically so that the material goes on to the forming rolls continuously. The process is shown in diagram, Fig. 1, as a part of the kettle system process chart. Cost estimates made in 1920 of a complete wall board mill are furnished below, as indicative of the detailed requirements. These estimates are on the basis of the mill being located adjacent to the calcining plant similar to plan of Fig. 1. Detailed description is omitted for lack of space, particularly as the data on the cost estimate give a better idea of the requirements than would pages of description. I would merely say that the mill buildings would be of steel construction, roofed and walled with corrugated iron and having concrete floors.

200,000 FT. BOARD PLANT—LOCATED IN THE MIDDLE WEST

Warehouse 250x80 ft. (covers R.R. track)	$60,000
14—125-ft. dryers and building	98,000
5—7-ft. producers—building	35,000
Green storage 100x100 ft.	25,000
Belt gallery 600x14 ft.	25,000
240 kiln cars	15,000
10,000 sq. ft. paper warehouse	35,000
Cutter	3,000
Wet end machine	22,000
Wet end belts	1,200
Second and third belts 600 ft.—slat type	15,000
Drive shaft roller	7,000
Dry mix and elevators, sawdust unloader, stucco (in plant), (outside stucco conveyor not included)	3,000
Trimming shears	1,200
Re-cutter	1,000
Warehouse trucks	1,500
Water supply	5,000
Stucco conveyor	10,000
Sawdust storage	8,000
Stucco storage	4,500
Wet end building	6,000
Fan and motor	2,500
Stucco scales	1,000
Transfer cars (two)	2,000
Railway	.....
Machine water heater	200
Superintendent's office and equipment	1,000
Call system	100
Power transformers — furnished by power company	.....
Garage	1,000
Toilets	1,000
Lockers and shower	2,400
Tools—repair shop	1,000
Repair shop	1,000
Test machine	50
Sample cutter	200
Thermometer—wet and dry bulbs	150
Scales—floor	100
Inspector's equipment	200
Heat wet end	.....
Heat take-off end	1,000
Boiler and water softener	12,500
Coal-handling machine	10,000

The total cost of plant estimated at $420,000 is $8.40 per thousand per year on output of 50,000,000 ft., which is approximately 80 per cent of capacity.

Costs based on—	
Tile, common, per 1000	$100.00
Brick, common, per 1000	23.50
Lumber, per 1000	75.00
Stone, per ton	2.33
Sand and gravel, per ton	1.50
Labor, per hour	.62½

EARNINGS AND EXPENSES—MILL LOCATED IN CENTRAL STATE

	Year 1920 January	February
Sales—Manufactu'd product	$17,186.40	$15,548.93
Sales—Miscellaneous	651.49	253.07
Total	$17,837.89	$15,802.00
Allowances	$ 11.48	$ 87.06
Net sales to customers	17,826.41	15,714.94
Miscellaneous earnings	30.29	18.43
Total income	$17,856.70	$15,733.37
Labor	$ 7,338.67	$ 6,376.97
Materials—Purchased	309.30	238.89
Explosives	356.39	291.78
Supplies	540.86	504.64
Calc. Fuel	1,290.67	1,950,54
Power	2,051.80	2,263.42
Repairs	794.81	684.46
Taxes	100.00	100.00
Insurance	408.89	380.40
Depletion	201.30	189.00
Depreciation	800.16	800.16
Jute sack expense	191.57	149.13
Paper sack expense	79.15	7.79
Barrel expense	33.52	15.15
Packing supplies	42.67	44.07
Miscellaneous expense	58.97	103.57
Total	$14,598.77	$14,100.27
Inventory adjustment	1,768.05	888.30
Balance	$12,830.72	$13,211.97
Transfer sales	3,713.10	3,161.80
Net manufacturing expense	9,117.62	10,050.17
Net cost—Manfctd. product	9,117.62	10,050.17
Miscellaneous purchases	557.93	214.34
Total mill expense	$ 9,675.55	$10,264.51
Gross profit	$ 8,181.15	$ 5,468.86

OPERATING COSTS OF A MILL LOCATED IN CENTRAL STATE

Mining Cost—Labor

	1918	1919	Jan.
Drilling, drilling helpers, brk. and load.	$0.405	$0.512	$0.569
Mucking	.....	.007	.042
Blasting	.....	.002	.007
Hauling	.101	.114	.137
Cage and hoist	.032	.031	.031
Timber	.042	.039	.031
Track	.043	.078	.103
Miscellaneous	.005	.017	.009
Bratticing	.003	.013	.....
Foremen	.046	.054	.051
Supervision	.096	.078	.063
Total labor	$0.773	$0.945	$1.043

Expense

Supplies	$0.038	$0.060	$0.065
Explosives	.078	.095	.088
Power	.015	.015	.015
Taxes	.043	.034	.025
Insurance	.054	.039	.041
Depletion	.050	.050	.050
Depreciation	.106	.072	.048
Misc. expense	.005	.001	.....
Repairs	.030	.076	.080
Total expense	$0.419	$0.442	$0.412

Crushing

Mine cost	$1.192	$1.387	$1.455
Tons mined	21.510	31.611	4.026
Feed crusher	$0.068	$0.083	$0.089
Miscellaneous	.020	.026	.030
Supervision	.012	.010	.008
Total	$0.100	$0.119	$0.126

LABOR COST OF PLASTER MAKING

Grinding

Dryer—First grind	$0.047	$0.050	$0.052
Miscellaneous	.014	.015	.018
Supervision	.009	.006	.005
Total	$0.070	$0.071	$0.075

Calcining

Fill kettles	$0.048	$0.054	$0.061
Calcining	.056	.062	.069
Fire kettles	.100	.023	.004
Elevate	.047	.055	.057
Regrind	.073	.070	.081
Miscellaneous	.097	.081	.094
Testing	.074	.075	.069
Supervision	.070	.038	.028
Total	$0.565	$0.458	$0.463
Tons calcined	16,330	22,371	2,275

Warehouse

Foreman	$0.029	$0.038	$0.046
Miscellaneous	.012	.021	.013
Mixing	.052	.059	.060
Sack and load	.255	.301	.366
Supervision	.064	.047	.038
Total	$0.412	$0.466	$0.523
Load bulk rock	.028	.068	.086

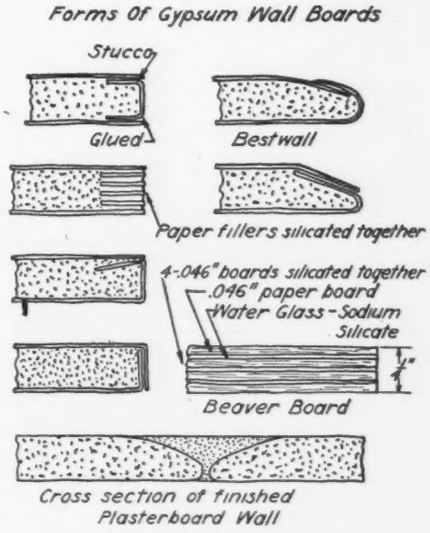


Fig. 11—Cross-sections of various forms of wall-board

TOTAL COST IN BIN

Crushed Rock

Mine run rock	1.180	1.317	1.432
Labor	.100	.119	.126
Supplies	.007	.013	.021
Power	.050	.050	.050
Repairs	.018	.005	.010
Insurance	.012	.014	.010
Depreciation	.033	.022	.020
Misc. expense	.009	.004	.004
Cost in bin	$1.409	$1.544	$1.673

Land Plaster

Crushed rock	$1.406	$1.544	$1.674
Labor	.070	.071	.075
Supplies	.005	.008	.013
Dryer fuel	.200	.200	.200
Power	.080	.004	.010
Repairs	.008	.008	.006
Insurance	.142	.108	.090
Depreciation	.006	.003	.003
Misc. expense	.....	.....	.....
Cost in bin	$1.917	$1.946	$2.071

Stucco			
Land plaster	2.358	2.323	2.419
Labor	.565	.458	.463
Supplies	.040	.050	.079
Power	.228	.221	.518
Repairs	.074	.126	.130
Calcining fuel	.406	.425	.567
Insurance	.066	.055	.036
Depreciation	.133	.097	.080
Misc. expense	.048	.017	.017
Defective material	.....	.010	.....
Cost in bin	$3.918	$3.782	$4.309

COST ON CARS	1918	1919	Jan.
Cr. rock—This mo.	$1.437	$1.636	$1.766
Land plaster bulk—This mo.	.....	.....	.....
Land plaster sacked—This mo.	3.075	3.367	3.027
Stucco—This mo.	5.066	5.230	5.243
Cement—This mo.	5.443	5.702	5.607
Wood fibre—This mo.	5.329	5.719	5.737
Finish—This mo.	.....	5.485	5.343
Brd. plaster—This mo.	5.284	5.323	5.426

POWER COST	1918	1919	Jan.
Power bought	$2,597.00	$4,902.43	$1,223.30
Power labor	2,372.11	2,065.53	199.47
Power fuel	5,073.57	6,584.33	629.03
Total	10,042.68	13,552.29	2,051.80

Shrinkage			
Per cent	19	16	14
Tons Per Kettle	10.2	10.1	10.4

Fuel Under Kettles			
Fuel oil gallons	.....	205,568	27,461
Coal—Tons used	1,289	343	.....
	.....	.037	.047
Price	$5.14	$5.460	.....
	.....	7,633.93	1,290.67
Amount	6,620.32	1,873.97	.....
Stucco made	16,330	22,371	2,275
	.....	.341	.567
Cost ton	.405	.084	.....
Kettles	1,596	2,212	218
	.....	3.451	5.921
Cost kettles	4.148	.847	.....
	.....	9	12
Gallons ton	158	30.6	.....
	.....	93	126
Gallons kettle	1,615	310	126

Fuel Under Boilers			
Fuel oil gallons	.....	140,937	11,918
Coal—Used	999	313	11
	.....	.032	.047
Price	$5.08	$5.46	$6.15
	.....	4,874.09	560.15
Amount	5,073.57	1,710.24	68.88
Total tonnage	18,333	82,183	8,056
	.....	.059	.070
Cost ton	.277	.025	.009
	.....	1.8	1.5
Gallons ton	109	7.6	2.7

	1918	1919	Jan.
Superintendent	$0.160	$0.203	$0.189
Eng. and Fireman	.056	.032	.....
Machine	.876	1.099	1.175
Kilns	.332	.431	.494
Warehouse	.717	.694	.570
Cleaning	.071	.128	.076
Sawing	.100	.143	.051
Miscellaneous	.001	.431	.288
Shipping	.213	.293	.330
Supervision	.....	.262	.205
Total labor	2.526	3.716	3.378
Plaster	3.918	4.249	4.753
Land plaster	.066	.119	.126
Paper	5.756	5.108	4.859
Total materials	9.740	9.476	9.738
Fuel	1.185	.936	2.021
Supplies	.009	.044	.056
Power	.354	.376	.569
Repairs	.134	.445	.239
Depreciation	.251	.428	.243
Insurance	.034	.389	.120
Taxes	.023	.077	.....
Miscellaneous	.030	.031	.004
Steam	.492	.....	.....
Shipping material	.004	.006	.....
Defective material	.....	.018	.....
Total expense	2.516	2.750	3.252
Total	14.782	15.942	16.368
Machine breakage	.252	.362	.202
Warehouse breakage	.050	.669	.836
Net cost good to date	15.084	16.973	17.406
Feet made	4,243,272	1,948,928	193,128
Plaster, 1000 ft.—Lb.	608	1,731	1,716
Paper, 1000 ft.—Lb.	171	164	155
Fuel per ton plaster—Lb.	.....	.....	7.9
Coal—Lb.	.....	33	.....
Oil—Gal.	25	29	27
Feet made all sizes	5,189,776	4,193,165	652,184
Boards per hour	359	342	354

What Quarrymen Should Know of Rock Formations

AT a meeting of the Institution of Quarry Managers in Buxton, England, Prof. P. G. H. Boswell, a geologist, read a paper which showed how a study of rock formations may help the practical quarryman both in selecting a site for a quarry and in working it after it has been opened. A portion of it which is adapted to American conditions is abstracted as follows. An earlier part of the paper described the ordinary terms, such as strike, dip, fault, etc., with which everyone is familiar:

The economic significance of the rock-structures may be briefly stated:

(a) If possible, leases should be secured along the strike of rock-formations and not along the dip. A maximum working-face is thus secured, and a minimum of overlying rocks (or overburden) is obtained. The "end-on" working of a bed is inadvisable.

(b) A low dip is preferable to a high one, for the probability of rock-slips on bedding-planes is thus minimized. If, however, the rock is better jointed than bedded, a high dip often means a low inclination for the joints, and consequent easy working.

(c) A dip into the quarry-wall is safer than a dip out from it. The latter condition, however, may lead to cheaper working by aiding the forward and downward movement of rock.

(d) Bedding-planes, joints and faults are passage-ways for water, and may be productive of landslips, especially if the inclination is towards the open part of the quarry.

As all minerals are not of equal hardness, the cost of quarrying a rock obviously depends on the mineral constitution. A quartzite or a firmly-cemented sandstone, largely composed of quartz, is much harder and more difficult to work, dress or crush, than a limestone, largely composed of the mineral calcite.

The economic significance of texture and mineralogy may therefore be stated:

(a) Since texture influences permeability, the presence of permeable beds overlying impermeable lead to continuous water-troubles, such as springs and seepages. Moreover, the junctions yield well-lubricated planes of weakness, which, combined with a favorable dip, provide the most effective conditions for serious landslips.

(b) The superposition of an impervious bed on a pervious one provides safer working conditions and may divert surface-drainage.

(c) Igneous rocks and quartzose sedimentary rocks give little trouble from weathering or rotting, but are more expensive to work on account of their hardness and texture.

Water Supply and Drainage—These questions have been incidentally dealt with in the above paragraphs. A little water is a necessity in every quarry. Too much water, like too much knowledge, is a dangerous thing. The unexpected tapping of water-streams may lead to serious subsidences. Water is potent in causing landslips, and water-logged beds are unpleasant and difficult to work. In winter, frost causes rock-shattering and rock-falls. Water is the expansive medium which permits the frost to do its work. Surface-drainage, if not controlled and diverted, often carries infection.

Overburden—The economic working of a quarry is often determined by the quantity and character of useless overburden, which has to be shifted. Only in the case of more valuable stone does it pay to mine beneath a thick cover. The overburden may be of two kinds, (a) consolidated rock, clastic or igneous, which continues the geological succession, or (b) the more or less unconsolidated material usually composed of sand, gravel, clay, etc., known as drift. Drift is one of the bugbears of quarrymen. It often thickens irregularly and forms pockets in the rock-surface. It may be water-sodden and slip easily into the quarry over the ice-polished surface of the solid rock. It may consist of tough clay, or be loaded with huge boulders which require blasting for their removal. Although there is often a sale for gravel and sand, much of the drift material cannot be economically disposed of; it is best avoided.

Selection of Site for Quarrying, Estimation of Resources, Etc.—It will be evident from what has been said above, that as thorough a knowledge as possible of general geological principles is essential for the proper selection of the location of a new quarry or the direction of extension of an existing one. The land taken should, if possible, lie entirely on the outcrop of the bed, and should be aligned along the strike. Overburden of "solid" rock is thus minimized; the overburden should be explored by mapping, trial-boring or trench-cutting. Surface drainage and the water-bearing capacity of the rock should be considered and the direction of flow determined. Heavily faulted ground means poor rock and bad water-troubles. For the estimation of resources the dip must be known, both as regards direction and amount.

White Marble Lime Company Changes Name

THE White Marble Lime Co., the oldest industry in Manistique, Mich., changed its name to the Manistique Lime and Stone Co. The company has been one of the chief industries here for about 40 years and the change in many was made by the directors in order to identify the company with the city.

Railroads Help in Promoting the Use of Agricultural Lime

The Operation of the "West Virginia Soil Improvement Special" by the Baltimore and Ohio Railroad

By Henry M. Camp, Manager
Eastern Division, National Lime Association, Washington, D. C.

IN the success of the development of the commerce of the country, production and transportation are closely related. One is dependent upon the other. Both are so interrelated in their respective industrial operations, as to justify that co-ordination of interests, which will contribute to the welfare of the business in which each is engaged. The Commercial Development Department of the Baltimore and Ohio Railroad has the right idea in this regard. It studied the possibilities of the creation of greater production and resultant tonnage by the industries located on its lines, through the employment of scientific and practical research in close association with the work of public educational institutions and trade extensional organizations, with the result that tonnage, lying dormant, by reason of the lack of knowledge as to its successful utility, is stimulated to the point of proper and profitable consumption.

As an instance of the energetic and progressive policy of this railroad in behalf of the welfare of its shippers, I want to tell the story of the operation of the so-called, "West Virginia Soil Improvement Special", financed and conducted by the Baltimore and Ohio Railroad Co., in August last, throughout the agricultural sections of West Virginia, covered by its lines, with the co-operation of the Agricultural Extension Service of the University of West Virginia, the National Lime Association, and a number of individual lime and limestone producers.

Organization of the Train Project

The make-up of this special train was composed of a Pullman sleeping car, a private combined dining and business car, a lecture and laboratory car, and exhibit car, with the necessary number of freight cars of lime to be given away to farmers for experimental purposes. A full train crew, was, of course, provided for the operation of the train, in accord with its special schedule of stops and lay-overs, in which perfect system was maintained. Hours of arrival at the various stops and other particulars relating to the general purpose of the train, were given wide publicity well in advance of the trip, so that practically every farmer of the different communities visited, could avail himself of its service.

Editor's Note

THIS ARTICLE details one of the most interesting experiments made during 1924 in the promotion of agricultural lime and limestone. The New York Central Lines, the Erie, and other railways ran similar trains, but in point of equipment and thoroughness the expedition described herewith was perhaps the most notable.

The author, who has the distinction of having served the lime industry in a promotional way longer than any other man, we believe had a great deal to do with the inception of this particular kind of promotional work and was in no small degree responsible for its success.

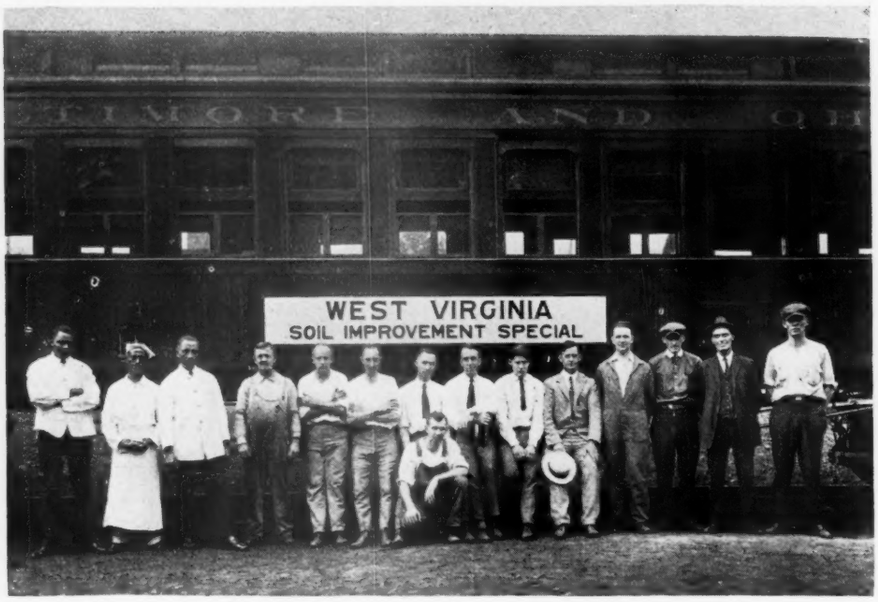
© Harris Ewing
Henry M. Camp

Personnel in Charge of Educational Activities

Those in charge of the educational and trade promotional features of the project consisted of officials of the Commercial Development Department of the Baltimore and Ohio Railroad, agricultural chemists, soil and crop scientists and lecturers of the University of West Virginia, the agronimist and soil liming expert of the National Lime Association and representatives of the lime and limestone producing companies that contributed material for the conduct of the project, making a total of about twelve men having a thorough knowledge of the agricultural conditions of the counties embraced by the trip, with respect to the practice of soil liming.

Train Service to the Farming Interests of the Territory Covered

In substance, the general purpose of the train was to introduce and broaden the understanding of the practicability of the prescription method of soil liming. In other words, to test the soil by scientific examination of it for the determination of its lime hunger or need, a fundamental principle in trade promotional work that is being recognized more and more, wherein, as the result of technical research and practical study, the use of a basic product becomes more efficient, and in final result of greater economic advantage to the consumer. In the preparation for this undertaking, as applied intensively throughout the regions in which it was planned to visit, the itinerary of the train was given wide publicity, with invitation to the farmers to bring samples of their soils to the train to be tested, in order to show whether or not they required lime for healthful growth and profitable production of the crop and how much lime should be applied to the acre. In order to make these quantitative analyses while en route, with the necessary degree of rapidity and accuracy and within the time limits set for each stop, the lecture car of the train was equipped with a laboratory, in which



West Virginia soil improvement train en route at Romney, W. Va., on the Baltimore and Ohio Railroad

were used a number of Truog soil testing apparatus; and, with the aid of three chemists on duty, from 75 to 160 samples of soil were tested at each point covered by the train, according to the length of time of each stop.

To give you an idea of the nature and extent of this analytical service, 2,802 soil samples were brought to the train for examination in the course of its trip of 800 miles covering two weeks and 22 stops, starting at Sleepy Creek, W. Va., on August 18 and ending at Proctor, W. Va., on August 30—an average of 125 analyses per stop .

At each station, upon arrival of the train, the farmers assembled in the lecture car where their soil specimens were given a serial number and letter and the test work begun. While this was going on, in their presence, the soil and crop specialists gave talks on soil liming, followed by an open-forum discussion of the several soil improvement problems as presented by the farmers themselves. Upon conclusion of the analyses of the soil samples, the chemists announced the results of each test, whereupon the farmers, whose soils were found to be in need of lime, were given a "prescription" calling for the number of pounds of liming material, lime marl or limestone, whichever was preferred, that should be applied to the soil per acre to neutralize the harmful acids which it contained. The farmer, upon presentation of the "Prescription" at the "drug store" of the train (the freight cars containing supplies of both the carbonate and oxide products) was given, free of charge, enough material as selected by him, to conduct a one-acre experiment as provided under the conditions of the test of his sample of soil.

In the course of the train trip, 55 car-

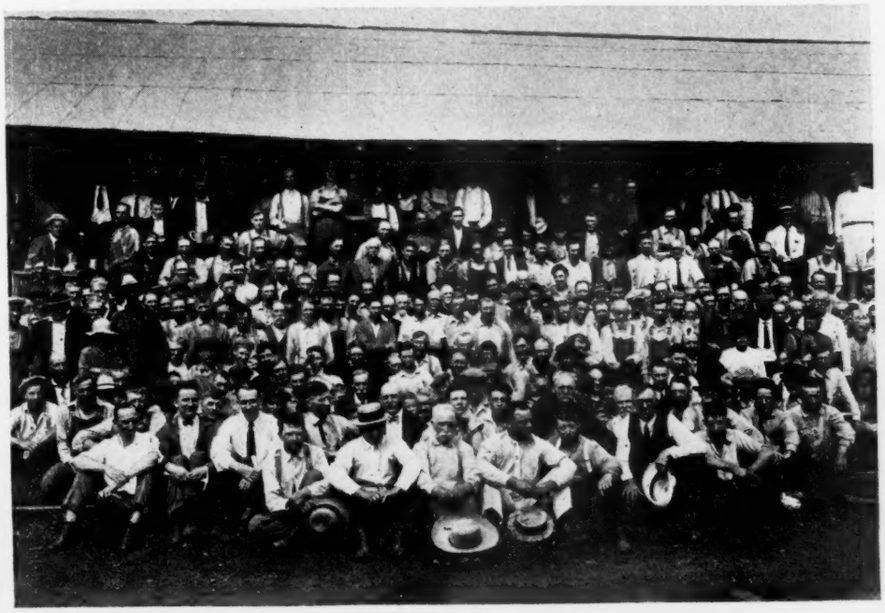
Scene of activity at one of the all-day stops. From left to right: (1) Farmers having their soil samples registered at the Farm Bureau warehouse platform; (2) Testing and lecture car; (3) Farmers receiving gratis "medicine" (lime necessary for one acre of "sick sour soil"

loads of lime, limestone and marl were distributed to the 2,800 farmers that patronized it, the material being contributed by the liming material producing companies selling their products in the territory embraced by the train project.

Interest Displayed by Farmers

From the beginning to the end of the trip, it was clearly apparent that the farmers who spent a day or so with the agricultural specialists of the train, appreciated the instructional value of its service, designed, as it was, to bring the message and point the way to the more effective use of lime in soil treatment; and, in which the agencies participating in the movement agreed, individually, that the outlay of expense and energy was well worth while as a combined educational and trade promotional proposition. The project was not one of the advertising type of "sample before you buy." It possessed that character of dignity in serious consideration of the welfare of agriculture, from which the natural flow of business, as very probably will come from it, can reasonably be counted upon as of a stable nature.

The application of sound business principles to the agricultural industry, particularly in the matter of the right study to operating costs, is being followed in greater extent by the average farmer. The teachings of the Federal and State agricultural extension authorities in behalf of the welfare of the agricultural industry is of that local intrinsic worth, as to command the moral support of every industry whose products are specified upon the determinations of technical research and practical usage. In the case of lime for soil improvement, we come within the category of products with their use defined largely by the science of modern agriculture. It, therefore, behooves all farm supply industries to "play the game" of trade promotion in line with the spirit of co-ordination of the elements that make for unity of genuine progress between producer and consumer, and it was under this policy that the "West Virginia Soil Improvement Special" made good in the interests of all concerned in its admirable purpose.



Farmers who gathered at Romney, W. Va., many of whom handed in samples to the "soil doctors"

One Illinois County Used 300 Cars of Agstone

EFFINGHAM county farmers, in the flush of better times for farmers, are building up their soil. Realizing that a constant drain on the land without any return being made to the soil of the things taken from it, means weed patches, waste land, abandoned farms, drabness and dreariness and loss to the owner they have launched an energetic campaign to improve their soil.

During this fall there have been approximately 300 cars of limestone unloaded in the county. That represents 13,500 tons, and at the normal application of four tons to the acre, something like 3,400 acres of land have been treated. The Farm Bureau office alone ordered 198 cars for Farm Bureau members and F. W. Wascher, farm advisor, says that there are independent dealers who have sold enough to bring the total up to 300 cars.

Orders for the limestone were put in last spring for fall delivery and in September and October began arriving. Two special trains on the Illinois Central, on the Indianapolis-Effingham division, brought 22 and 23 cars of lime each. These two trains stopped anywhere that limestone was wanted along the right of way between Effingham and Dieterich, and the stone was dumped on the right of way from the side-dump cars.

These stops cost 5 cents additional per ton, but saved three miles of hauling on the average.—*Decatur (Ill.) Herald.*

The Bainbridge, Missouri, Limestone

"THE Bainbridge limestone is a formation of the Silurian age, out-cropping along the Mississippi River north of Cape Girardeau, Mo., according to John R. Ball professor of geology in Northwestern University. "It outcrops also near Ste. Genevieve, Mo., a city about 50 miles north of Cape Girardeau. Associated with other formations of Silurian age, it is recognized at several points between these two places. Formerly it had been regarded as a unit formation of about the same age as the Silurian limestone, which underlies Chicago. In most places it is commonly barren of fossils, but the discovery of several ledges rich in fossil remains has made possible recently a detailed study of its fauna."—*St. Louis (Mo.) Post-Dispatch.*

South Dakota's Experiment in the State Cement Plant

UNDER the heading, "Another Experiment," the *Sioux Falls (S. D.) Press* says editorially:

"It would seem that if state ownership of any industry is ever to be advisable and practical, South Dakota has a chance to demonstrate it. There seems to be no reason why an excellent quality of cement cannot be turned out at the state plant, and that there is demand for this product is unquestioned. It has been determined to sell cement at the going price, at least until the bonds are retired, so that for the present the manufacture of this commodity by the state will not result in a direct saving to the consumer. Later, when the plant is paid for, this policy may be changed.

"The experiment will be watched with great interest not only in this state but elsewhere. The history of state ownership is not a happy one. Disaster has attended many such attempts. The *Press* has never been enthusiastic over either state ownership or municipal ownership. Politics too many times enters into the equation. Competent executives have often been forced, through the pressure of politics, to employ incompetent assistants and such institutions become the roosting place for 'lame ducks.' Private enterprise has seemed to be more efficient in almost every instance. If politics can be kept out entirely it may be possible for South Dakota to have a successful institution out at Rapid City. Of course, it will be necessary to properly solve transportation and other like problems, but these confront every similar business."

Hints and Helps for Superintendents

Combined Roll and Feeder for Hydrator

A SET of rolls is not only a crusher but a feeder—wherever there is no return circuit. The amount that can be put through the rolls is regulated by varying the distance between them.

Advantage has been taken of this at the hydrating plant of the Rockland-Rockport Lime Co. in feeding the hydrator. The lump lime is drawn from a bin above the rolls through a gate. The size of opening of this gate is regulated by the lever shown in front. Through this gate the lump lime falls into the rolls which crush it and pass it on to the enclosed screw feeder shown below the rolls. The screw feeder takes the lime to the hydrator.

Rolls which crush lime and also feed hydrator

This arrangement was devised by W. C. Bird, the general superintendent of the Rockland and Rockport Lime Corp., and it was built at the plant.

Repairing a Split Conveyor Belt

AT the coarse-crushing plant of the Moctezuma Copper Co. at Nacozari, Mexico, a piece of tramp drill steel became wedged between the jaws of a double-pole magnet suspended above a 53-ft. conveyor in such a way that the belt was neatly cut for half its entire length before the motor could be stopped. The two halves slipped upon each other a distance of several inches. Strips of 6-in. transmission belting were riveted to the upper and lower sides and, 13 months later, the conveyor is still giving excellent service. Wooden blocks have since been inserted between the jaws of the double-pole magnets to prevent the recurrence of a similar accident.—*Engineering and Mining Journal-Press.*

Labor-Saving at the Quarry and Pit

UNTIL electric or gasoline shovels are universally adopted, every operator will still have a use for coal, and if labor saving is to be carried out in coal handling as well as in the plant proper, superintendents may get a suggestion from the illustration herewith.

This is how P. J. Gilcrist, superintendent of the Cedar Cliff plant of the New York Trap Rock Co., has solved his coal-handling problem. His coal is only for three 50-ton steam shovels, so there can not be a very large tonnage to be handled, yet if to handle this tonnage he has installed a Link-Belt portable belt conveyor.

Conveyor installed for handling coal for steam shovels

The installation, however, is not portable, for the lower end of the conveyor is set into a track pit where hopper-bottom railway cars can dump. It looks like a pretty good way to handle the unloading of coal cars on a small scale.

Portable Air Compressors

By R. N. VAN WINKLE
Hawkeye Quarries Co., Cedar Rapids, Iowa

IN looking around to find some mechanical appliance or mechanical development that has been most useful, in the past year, in our operations, nothing can be found that to our way of thinking has served us more efficiently than our portable gasoline air compressor. Our machine was primarily purchased to furnish air to operate jackhammer type of drills for plugging stone too big for our crushers and was first used solely in connection with such secondary shooting operations, but it was only a matter of a few days until it became a practical and much desired piece of machinery in many ways.

As soon as our men became familiar with the operations and details of this portable compressor they were quick to realize that it was a saver of time and energy, not only in plug-drilling stone, but for furnishing power to operate riveting guns, chipping and caulking hammers for boiler work and furnishing air for the operation of field blacksmith forges, cleaning and blowing out electric motors, spraying paint and inflating automobile tires on trucks used around the quarry. To the writer's surprise on going onto the job one day he found the machine being pressed into service cleaning, or blowing out the living quarters used by the men.

The stationary air compressor was a necessity around a quarry in the days of the tripod drill, but with the advent of the deep well drill, big unit compressors became "white elephants" and have continued to be operated at low efficiency and high cost to furnish the air required in plugger drills and other minor quarry operations. But with the improvements that have been made in the portable outfits there are many reasons why almost every quarry operation should have one or more portable outfits of a suitable size.

The gasoline portable compressor, as we have it today, is a self contained unit easily transported from one location to another in the quarry; it is economical as to fuel, oil and labor and due to the fact that it can be moved right up to the operation using the air, it is highly efficient; there being no loss by pipe friction, leakage and shrinkage of pressure during extremely cold weather.

the things familiar to the quarryman when using air developed by stationary units where the source of supply is far from the base of operations.

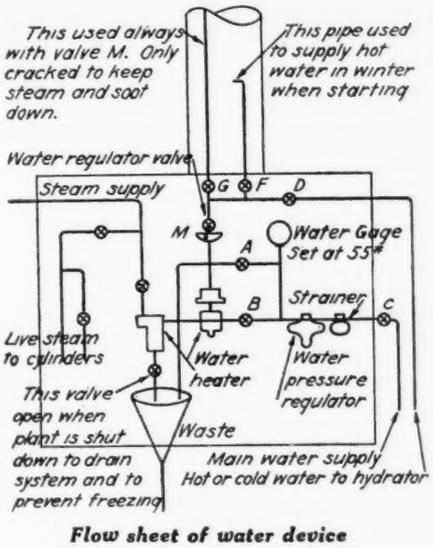
From strictly a financial point of view a portable self contained compressor, saves the expense of costly pipe lines, valves and pipe fittings, saves the expense of an attendant which is necessary where using a stationary compressor and can be operated day, night or Sunday independently and without affecting any other quarry operation. It can be run or stopped at will with little or no effort and is therefore saving of fuel and oil. It does not require a licensed engineer or a high grade, high priced mechanic to operate, but, with us, is operated and attended by the driller, the boiler maker or a man doing the actual work.

As has been the case with almost every new piece of machinery or equipment put on the market, the first portable gasoline compressors were rather crude and unreliable, but improvements have been made which make them almost fool proof, and irrespective of the size of the quarry operation, they fill a long felt need and are a real utility player and pinch hitter in the operations of any quarry today.

Water-Heating Device for Lime Hydrator

A HOME-MADE water-heating device at the lime plant of the Rockland and Rockport Lime Corp., Rockland, Me., is shown herewith. This device is attached to a Kritzer continuous hydrator. It is described by W. C. Bird, general superintendent, as follows:

"At the present time and during the warm summer months we do not use steam at all for heating water, but simply use the live steam direct into the cylinders of the hydrator.


This used always with valve M. Only cracked to keep steam and soot down.
This pipe used to supply hot water in winter when starting
Water regulator valve
Steam supply
G
F
D
M
A
Water Gage Set at 55#
B
Strainer
C
Live steam to cylinders
Water heater
Water pressure regulator
This valve open when plant is shut down to drain system and to prevent freezing
Waste
Main water supply Hot or cold water to hydrator

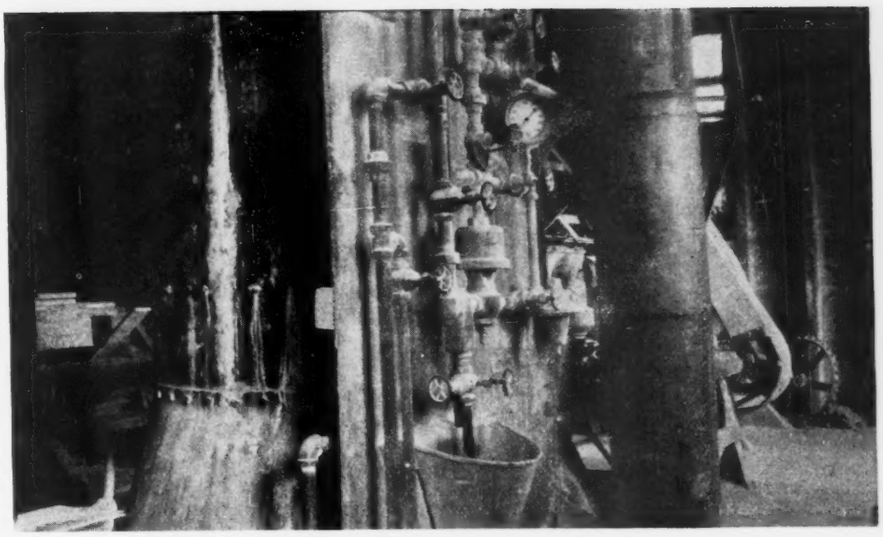
Flow sheet of water device

"Running this way, valve *B* is shut, and valve *A* opened, allowing the water to come through regulating valve *M* to mix with the lime. Valve *F* is closed, and valve *G* is partly open all the time to allow the water to come in the top of the stack, which keeps the steam and dust down.

"In the winter we heat the water only when first starting, after which the system works as during the summer.

"In order to heat the water, we open valve *C* first, then open valve *B*, keeping closed valves *A* and *M*. This allows the water to come to waste. We then turn on the steam supply, and let this waste water get heated up to a point which is sufficient. It is then turned into the system, opening valve *B* and closing valve *A*. At the same time valve *F* is opened and the hot water used until the lime begins to hydrate sufficiently. Then the steam supply is turned off and cold water allowed to go into the system.

"Our water pressure is so high that we have to have a pressure regulator which regulates this pressure to 45 lb."



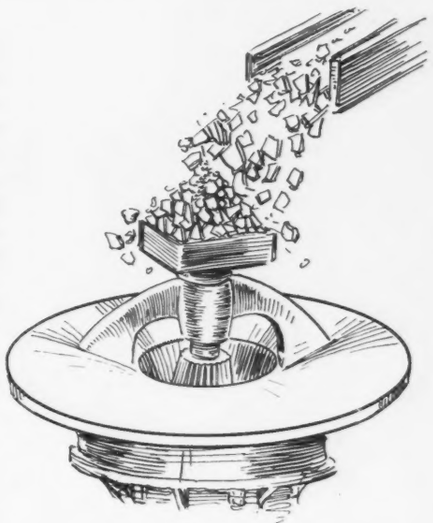
Water-heating device on hydrator at Rockland lime plant

A Novel Dust Cap for a Crusher

A REAL novelty is shown in the accompanying sketch (the conditions did not permit a photograph being taken) at the crushed stone plant of the Buffalo Cement Co., Buffalo, N. Y. It is the invention of F. C. Diebold, the superintendent of the plant.

The thing is so simple as hardly to need explanation. The ordinary rounded dust cap is replaced by a box made of steel plate. This fills with stone from the chute. The wear instead of coming on the dust cap comes on the broken stone in the box. As this wears out, of course, other stone takes its place.

The principle, that of having the material to be handled make its own wearing surface, is one that has been often applied and which might be applied more. In the chutes of crushed stone plants or the launders of gravel plants a bottom may be made of the material by putting in short cross strips to catch and hold the pieces. The chute or launder has to be given more grade, however, as the friction on such a bottom is considerably more. Tube mill linings which renew themselves by catching and holding pebbles and large pieces are an old story.



Novel dust cap for crusher

One might suggest that the box shown in the cut would do quite as well if it were cylindrical as well as square and it would be no harder to make.

Work on Projected Bath Cement Plant

THE Bath Portland Cement Co., Bath, Penn., will proceed with the construction of its proposed cement mill at Sandts Eddy, near Easton, Penn., estimated to cost $1,500,000, for which plans have been drawn by the Public Service Production Co., Public Service Terminal building, Newark, N. J., engineer and contractor. The last noted company will also be in charge of erection.

On the Constitution and Burning of Artificial Portland Cement*

Part VIII. Continuing the Study of Hydraulic Cementing Materials Other Than Artificial Cements†

By J. E. Duchez

(Authorized Translation from the French Revue des Materiaux de Construction by C. S. Darling)

THE constituents of the cementing materials we are studying are always the same:

$$x\mathrm{SiO_2}+y\mathrm{Al_2O_3}+n\mathrm{CaO}$$

but the chemical composition of the raw materials is such that the value of n is near or equal to

$$3(x+y).$$

The reaction of maximum basicity obtained in the burning is in the neighborhood of

$$x(\mathrm{SiO_2}3\mathrm{CaO})+y(\mathrm{Al_2O_3}3\mathrm{CaO})$$

the formula of Le Chatelier and may be as low as

$$x(\mathrm{SiO_2}2\mathrm{CaO})+y(\mathrm{Al_2O_3}3\mathrm{CaO})$$

the formula which we use.

In these formulas the alumina always being in the form of $\mathrm{Al_2O_3}3\mathrm{CaO}$, there will be a slow or moderately slow setting product if the burning has been properly carried on, or a quick setting product if the burning has given aluminates less basic, and the quickness of setting will increase in proportion to the amount of free lime present.

$$x(\mathrm{SiO_2}2\mathrm{CaO})+y(\mathrm{Al_2O_3}2\mathrm{CaO})\mathrm{CaO}$$

the time of setting being a function of the rapidity of liberation of $\mathrm{Al_2O_3}3\mathrm{H_2O}$ and its coming in contact with $\mathrm{Ca(HO)_2}$.

In general on hydration, all the alumina content combines with the lime, and the product always gives an excess of uncombined hydrate of lime coming from the free lime of the cement or from the hydrate of lime set free in the setting of the silicate.

The only improvement which can be made on the cement is to assure on setting the lamellar crystallization of $\mathrm{Ca(OH)_2}$ by a weak addition of monocalcic aluminate or fused cement after burning or an increase in the alumina content of the mixture before burning.

We can indicate the crystallization of the hydrated cement in the following form:

$$x(\mathrm{SiO_2CaO2.5H_2O})=x \text{ needles}$$
$$y(\mathrm{Al_2O_3CaO12H_2O})=y \text{ lamellas}$$

and according to the accepted composition of the silicate, the hydrate of lime remaining free will be

$$x\mathrm{Ca(HO)_2}=x \text{ hexagons}$$

or

$$2x\mathrm{Ca(HO)_2}=2x \text{ hexagons}$$

We have already given our opinion on the possible basicity of the cement, therefore we do not wish to repeat it. But we note once more that the more basic the silicate the greater the hexagonal crystallization and the less strength has the product.

In order to obtain a product of maximum adhesion and cohesion it will be necessary to add as much less monocalcic aluminate as the silicate of the cement is less basic.

The consequences of these determinations are as follows:

1. *High strength portland cement*—M. Hendricks has shown that cement made up of the form $x(\mathrm{SiO_2}2.5\mathrm{CaO}+y\mathrm{Al_2O_3}3\mathrm{CaO})$ were stronger than others composed of the form $x(\mathrm{SiO_2}3\mathrm{CaO})+y(\mathrm{Al_2O_3}3\mathrm{CaO})$.

M. Bied has shown that fused cement made in the water jacket or electric furnace of the formula $x(\mathrm{SiO_2}2\mathrm{CaO})+y(\mathrm{Al_2O_3}\mathrm{CaO})$ gave also cements of greater strength than those of the formula indicated by M. Hendricks or M. Le Chatelier.

Now we notice one thing: these cements of M. Bied or M. Hendricks show, with relation to M. Le Chatelier's cement, the following peculiarities:

The fused cements of M. Bied leave no place whatsoever for hexagonal crystallization, and all the lime, even that liberated from the silicate, will be combined in a lamellar crystallization.

The incipient fusion cements of M. Hendricks, as compared with those of M. Le Chatelier, leave only an unimportant place for the hexagonal crystallization.

If we follow the experiences of Dr. Passow regarding the iron portland cement, we note similarly that the best results are obtained with the aluminous blast furnace slag, while the factories which have operated with silicious slag often contradict the statements of Dr. Passow. The same explanation holds, that the needle or lamellar crystallization takes the place of the hexagonal crystallization and the strengths are as much more

tion of the aluminate increases over the nee-

rapidly attained as the lamellar crystallizadle crystallization of the silicate.

Although we have never been able to obtain the excellent strengths claimed for the fused cements it is not to be doubted that the slightly silicious cements regularly have a greater strength than the incipient fusion cements which are generally more silicious by a considerable amount than the fused cements. The *Societe des Forces Motrices de l'Agout* produces monocalcic silico-aluminates much more uniform in their strength than the fused cements, and on the average, the fused cements which we have been able to procure have not given more than 40 kgr. per sq. cm. strength in eight days and 32 kgr. at 48 hours with a neat cement, and often much less, even below 20 kgr. at 48 hours.

We can explain the high initial strength of aluminous fused cement by the fact that the hexagonal crystallizations of the hydrate of lime set free or that freed during the setting of the ordinary cements is replaced by the crystallization of the alumina hydrate through the crystallizations of the silicate and the aluminates. This is one of the causes of the satisfactory action of these cements in sea water.

Therefore, it is evident that the correction of the initial strength of a natural or artificial portland cement can be accomplished after burning by the addition of aluminate less basic than 3CaO, whether by the addition of monocalcic aluminate, fused cement, or aluminous slag.

We thus obtain at prices below those for fused cement, high strength cement approaching, if not equal to, the strength of fused cement.

The additions are easier in this form than in the raw mix. In this way there are not the difficulties of operating the kiln with mixtures which are too high in alumina.

The quantities to be added vary according to the chemical composition. It is preferable to determine them by trial, since it would be quite difficult to establish a law of proportions in crystallizations.

2. *Quick-setting high strength cement*—In general, these cements are rich in alumina and sulphuric acid; their strength is low compared with that of artificial cement, and they set in from five to ten minutes.

With the addition of monocalcic aluminate or fused cement to the artificial portland cement, there are obtained rapid setting ce-

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†*Revue des Materiaux de Construction*, August and September, 1923.

ments. These have the advantage of containing little sulphuric acid and little magnesia. Besides the monocalcic aluminates in their hydration absorb the lime and reduce the chances of expansion. They last better than the ordinary quick-setting cement and retain their quality of rapid setting for a long time.

The addition of monocalcic aluminate—by absorption of the free lime of the cement—determines the rapid set and the high initial strength quite like that produced in the ordinary quick-setting cement. The silicate afterward sets and the final strengths are those of artificial portland cement, much higher than those of quick-setting cements.

It is evident that the rapidity of set thus obtained depends on the quantity of lime contained in the cement and susceptible of reaction with the hydrated alumina set free by the hydration of the monocalcic aluminate. It is rare that a cement does not fulfill these conditions; in any case, it is easy to remedy it by a weak addition of hydrate of lime or hydraulic lime. Some practical experiments will quickly permit the determination of the proportion of the mixture to be made.

3. *Rapid-setting grappier cement*—The majority of the grappier cements have a very slow set which make their use, and consequently their sale, difficult.

Besides, they always contain a fairly high proportion of free lime, and often expand.

The addition of fused cement or monocalcic aluminate will have the advantage of causing them to set more rapidly in proportion to the amount of the addition. There will be, besides, a decrease in the amount of expansion and even the disappearance of all traces of expansion, if the quantities of expandable materials are not too noticeable.

An addition of 5% monocalcic aluminate from the *Societe des Forces Matrices de l'Agout* to the grappier cement of Cap-Usclat has given 7 kgr. in 48 hours and 17 kgr. at 8 days. The strength remains afterward fairly stationary at 27 days and at 3 months; at 6 months it reaches 20 to 22 kgrs. These cements which give 14 mm. spacing divergence or dispersion spread with the La Chatelier needles do not give more than five to eight mm. after the addition. The beginning of the set is about 2 hours and the end of the set 6 hours and 30 minutes, while alone these cements begin to set at 16 hours and finish at 36 hours. With an addition of 10 per cent of monocalcic aluminate the beginning of this set takes place in 50 minutes and the end in 4 hours and 30 minutes. With 15 per cent, the beginning of the set takes place in 7 minutes and the end at one hour and 30 minutes, the strength at 24 hours is 4½ kgr., 8 kgrs. at 48 hours and 17 kgr. at 8 days (using neat cement).

4. *Rapid-setting slag cement*—These cements usually have a very slow set, although they are aluminous, but as we shall see in the chapter on puzzolanes, there is a tendency in their composition to retain a slow set in spite of that.

The addition of fused cement or monocalcic aluminate accelerates the set, but it is necessary to avoid too strong addition in order to leave enough free lime to assure the silica-lime combination which comes later.

Extra Heavy Hydraulic Lime

The molecular composition is always

$$x\mathrm{SiO_2}+y\mathrm{Al_2O_3}+n\mathrm{CaO}$$

but the values of n diminish and are often much below

$$3(x+y)$$

The reaction from burning can no longer assure the saturation of the silica and the alumina with lime and the limes obtained have as formula:

$$x(\mathrm{SiO_2}2\mathrm{CaO})+y(\mathrm{Al_2O_3}2\mathrm{CaO})$$

or

$$x(\mathrm{SiO_2}2\mathrm{CaO})+y(\mathrm{Al_2O_3}\mathrm{CaO}).$$

In the first case the reaction of hydration is complete.

$$x(\mathrm{SiO_2CaO}2.5\mathrm{H_2O})+y(\mathrm{Al_2O_3}3\mathrm{CaO}12\mathrm{H_2O})$$

The lime is heavy and possesses qualities approaching those of cement.

In the second case, the reaction is incomplete:

$$x(\mathrm{SiO_2CaO}2.5\mathrm{H_2O})+\frac{2y}{3n}(\mathrm{Al_2O_3}3\mathrm{CaO}12\mathrm{H_2O})+\frac{y}{3}\mathrm{Al_2O_3}3\mathrm{H_2O}.$$

There remains some alumina hydrate which is capable of combining with lime.

The set of these limes is generally slow because the free alumina must wait for the liberation of the lime of the silicate to be combined with it.

According to the location, their sale is difficult for the reason already given that certain contractors do not wish to use them and prefer the "light" limes which are often but little hydraulic.

The addition of monocalcic aluminate cannot change anything with these limes in the majority of cases unless at the same time there is added "light" limes which decrease their density and are favorable to the action of the aluminate.

The consequences of these observations are as follows:

Rapid-setting mixed lime—The density of an extra heavy lime can be decreased by the addition of a light lime. The burning of the limestones is done separately and the addition made before slaking.

If the limes are silicious, the addition of a light lime generally makes the setting slower, but the addition of monocalcic aluminate makes it possible to obtain the entire range of setting times desired.

Conclusions

The action of the addition of aluminates less basic than 3CaO to hydraulic cementing materials varies according to the free lime content of the cementing materials. The combination of these products with the lime to complete the three molecules of basicity modifies the crystallization of the cementing material as a whole by the suppression or decrease of the hexagonal crystallization of hydrate of lime. There is as a result an increase of the strength of the mortar because of the increase in adhesion and cohesion in the crystals. The rapidity of the combination of the alumina hydrate and the hydrate of lime increases the rapidity of set of the cementing material and causes, for the reasons given above, a noteworthy increase in the initial strength. The final strength undergoes no change, inasmuch as it results in the delayed action of the hydrated silicate.

We know that the influence of these additions has been much discussed. We call attention to the fact that they have no foreign elements the existence of which has not already been recognized in the product of the best brands and the best qualities and that consequently their incorporation after burning is no more dangerous than their formation in the cementing material as a result of the burning. The reactions at the end of the set remain the same when the materials put in contact are in a soluble state, permitting combination in the form of the hydrated monocalcic silicate and tricalcic aluminate hydrate, whatever the manner in which they have been put into the mixture, which on complete hydration gives place to the formation of the definite system of crystallization of these two salts:

$$x(\mathrm{SiO_2CaO}2.5\mathrm{H_2O})+y(\mathrm{Al_2O_3}3\mathrm{CaO}12\mathrm{H_2O})$$

We believe therefore that it is useful now to give the results of our studies on the causes of destruction of mortars in order to permit more readily following later the discussion which will prove that these additions can have no harmful effect.

(To be continued)

California "Chalk Rock" Ranch Incorporated

INCORPORATION of the King C. Gillette ranch at Santa Barbara, Calif., with capitalization at $1,000,000, gives basis to belief that the large "chalk rock" deposits on the ranch southeast of Lompoc are to be developed.

Three months ago leases were taken on "chalk rock" deposits on the Hollister ranch, further east, by the Featherstone Products Co., which is quarrying rock.

Until these activities the Celite Products Co. of Lompoc was alone in the field.—*Los Angeles Examiner.*

[The "chalk rock" referred to is evidently diatomaceous earth.—Ed.]

Phosphate Rock in China

THE *Chinese Economic Bulletin* lists two phosphate rock mines as being worked in Kiangsu province, China. One of these is at Hsiungshan, owned by Yang Yu-tsao, and contains 1010 acres. The other, containing 2168 acres, is at Tunghai and is owned by Sheng Chi-yu.

A Future Market for Sand and Screenings

Improvement of Pavement Sub-Soils by the Use of Granular Materials

By Clarence D. Pollock
Consulting Engineer, New York City

THE foundation and sub-grade are very important parts of a pavement and are deserving of very careful consideration in designing the pavement. The foundation should be sufficient to transmit the load on the pavement surface to the sub-grade without material deformation and distribute the load over a sufficient area of the soil so that the intensity of pressure does not exceed the safe bearing power of that soil. Too little attention has been paid to these matters in designing pavements in the past, but with the much heavier loads of modern traffic, more consideration is being given them. The Bureau of Public Roads in Washington has been making and is now carrying on tests to obtain more data in regard to the behavior of pavements under varying conditions of loading, impact, and sub-soil, and the results will be of great assistance to engineers having to do with the designing and constructing of pavements. Others are working along similar lines and the result should be the obtaining of much data from which some general conclusions may be drawn.

The Most Satisfactory Foundation

An old macadam pavement has proven a good foundation in many cases when it was not necessary to make openings in it for sub-surface structures, but usually in city streets the most satisfactory foundation is one of portland cement concrete, commonly mixed in the proportion by volume of one part cement to three parts sand and six parts of broken stone or washed gravel. This foundation is generally laid either five or six inches in depth upon a well compacted sub-grade. *Where the sub-soil is sand or other porous and granular material, these depths have proven sufficient even for the heavy present day traffic.* For example in the Borough of Manhattan, New York City, where the sub-soil is mostly sand or of a porous nature, for a considerable period of years the cost of repairs due to foundation failures has been kept separate from other maintenance repairs, and with six inches in depth of 1:3:6 concrete, as stated by the engineer at the Philadelphia Paving Conference the cost of such repairs amounted to less than one-tenth of one per cent of the total cost of maintenance repairs per year. Any increase in depth of foundation here would surely be unnecessary and a waste of money.

Clay Sub-soil Needs Special Treatment

However, the situation is different when the soil consists of clay or other material which may become plastic and not afford sufficient support for the foundation of the pavement during at least part of the year. Placing a greater depth of concrete will help in spreading the load over a greater area of the soil, but it is expensive and if the soil is one which has a considerable volume increase with the increase in its water content, it will not materially help matters as the thicker concrete will heave about as readily as the thinner.

Now if instead of increasing the depth of the concrete under such conditions, a layer of the clay or plastic material be removed and replaced by *a granular and porous material such as sand, gravel, crushed stone, slag or the like,* and the concrete foundation is built upon this porous layer, it has been found that the sub-grade does not swell and heave the pavement. This granular course not only provides drainage, but distributes the load over a larger area, similar to the ballast under railroad ties; also it decreases the friction on the under side of the concrete and thus helps in preventing the formation of cracks.

Also it has been found that with clay against the under side of the concrete that with even very small differences in temperature between it and the concrete that there is a condensation on the under side of the concrete which in cold weather freezes and thus adds to the volume increase, and consequent heaving of the pavement. With the granular layer between the foundation and the clay sub-soil there is no condensation on the bottom of the concrete and thus this trouble is avoided.

Tile Drains Tried But Not Satisfactory

Other methods for improving the clay sub-soils have been tried as in the case of the Bates test road in Illinois where tile drains were placed under each edge of certain sections but without success although the trenches were backfilled with cinders and observations were carried on for a period of three years comparing these sections with adjacent ones having the same conditions, but no tile drains. *So far the method of placing a granular layer on top of the clay before laying the foundation and pavement is the safest and also the most economical plan.*

There are many soils between the sand and the clays, and the question arises as to which of these will properly support a pavement and which will require a porous layer under the pavement foundation? The Bureau of Public Roads is now investigating this side of the problem and is obtaining much in-

C. D. Pollock

Editor's Note

***HAVING** several times hinted that a market for waste screenings and sand might be developed for improving sub-soil conditions under pavements—ballasting pavements—we decided to get the viewpoint of a man who is perhaps the best known American consulting engineer in the pavement field. We are glad to say that his experience has justified our somewhat vague assumptions, and our latest article on the subject in Rock Products, November 15, 1924, page 48.*

The author is a graduate of Massachusetts Institute of Technology, and has had many years' experience as a municipal engineer in various bureaus of the city of New York. He has also been chief engineer of pavements in the cities of Havana, Cuba, and San Antonio, Texas. At present he is a consulting engineer in private practice in New York City, and recognized as an international authority on pavement design and construction.

teresting data, but because of the many kinds of clays in the soils and their different effects it is probable that no very definite rules will result, but some general conclusions may be drawn such as that a soil high in clay and high in water absorption will usually have a high volume change and consequently require the placing of a granular layer at the sub-grade. The judgment of the engineer from his experinece must play an important part in deciding where to draw the line, however. There are many cases of streets and roads where the clay will be found only here and there in sections, and of course it will be necessary to place the porous layer at these points only. Other cases will be found where it may be more economical to add a small amount of sand and work it into the sub-soil rather than to place a separate layer.

What Thickness to Make Granular Layer?

Studies are being made to determine the propert thickness of the granular layer, when it is required. The writer has obtained uniformly good results with five inches and even with four inches, and understands that others have had excellent results with a thickness of only three inchs of granular material. In tests with some clays by placing the sand layer very carefully a two inch layer has proven successful, but we believe that it is better to use a greater thickness than two inches because of the difficulty of securing a sufficiently uniform depth of two inches in actual construction.

Another advantage of a greater depth is that the greater thickness of the granular layer will distribute heavy loads better on the sub-soil. Tests tend to show that it may be possible to decrease the thickness of concrete foundations in many cases by the use of the porous layer because of this feature of distributing the load over a greater area of sub-soil. More tests along this line are desirable, and some are being made. If future results confirm those previously obtained, there should be much valuable data available from which to make deductions as to what extent the depth of concrete foundations may be reduced safely in certain cases, and also as to the use of other and less expensive forms of foundations under certain conditions such as in highways and streets in many of the smaller cities and towns.

It is probable that it will be desirable to continue the use of foundations six inches in depth in the larger cities because, with frequent openings for trenches due to the constant changes in the structures along the streets, the bridging effect of this depth is valuable in case the backfill settles; but in other places where few openings are anticipated, it is probable that a considerable saving may be made on the foundation, so that a more expensive and higher type of pavement surface may be afforded.

The writer has laid a large amount of granite block pavement on five inches of concrete over a granular soil without any foundation failures, and has also had excellent success with a rolled stone foundation over a similar subgrade when it was in a location not subjected to trench openings, and paved with granite block surface subjected to heavy truck traffic.

More Attention Bound to Be Given to Sub-soil Conditions

With the enormous sums of money being spent on highways and streets each year it would seem as though as much thought should be given to the soil and foundation conditions as is given to these features in connection with buildings. The soil condition should be studied and if it is of a suitable character to properly support the pavement and its traffic during all seasons of the year, it should be corrected so that it will do so.

In improving clay soils by means of a porous granular layer, the layer may consist of sand, gravel, crushed stone, slag or other similar material. The test requirements for these materials need not be high as there will be no abrasive wear on the layer. This should prove an outlet for materials which may not be quite up to the requirements for use in concrete, but which are granular and will form a firm but fairly porous layer at a reasonable cost. A mixture of sand and gravel, or screenings also is suitable for this use. This should make a market for much of the material which is often a waste product and at the same time permanently improve the sub-grade of the roadway.

The Economic Basis for an Oil-Shale Industry

HOW much is it going to cost to produce shale oil on a continuous, commercial basis? As might be expected, estimates differ widely, for, except perhaps in one or two instances, operations in this country are on a frankly experimental scale. The question is nevertheless of real interest, for it is basic to practically every other consideration in the possible industrial development of oil shale.

In one of the recent articles where attention has been given to the component elements that make up the estimated cost of shale oil, the author arrives at the rather unsatisfactory conclusion that the total cost may vary between 87 cents and $3 per barrel. This would seem to be but another way of saying that, for practical purposes, the question is still unanswerable.

It calls to mind a question that some of our friends in the petroleum industry have been pondering for a long time: How much does it really cost to produce petroleum? In 1922 R. L. Welch, testifying before a Senate committee, said: "I can think of no more hopeless task than to attempt to arrive at the fundamental cost of so complicated a thing as a barrel of crude oil. . . . It is my judgment that every barrel of oil which has been produced in the history of the business has been sold below the aggregate amount of money which has been poured into oil production."

Just lately some startling figures have appeared that would seem to confirm this view. E. W. Marland and C. C. Osborn, in a survey on behalf of the National Petroleum Marketers Association, found that the average cost of producing crude oil during the two and a half years ended June 30, 1923, was $2.17 per barrel when one considered only the actual expenses for drilling, pumping, bonuses and rentals. The tremendous overhead for geological exploration, interest, taxes and administration is not included. Comparing this cost with the average market value of crude oil, which, after deducting royalties, was $1.36, shows a clear loss of 81 cents per barrel. These figures, even allowing for widest variation, reveal a most unhealthy situation. Certainly this is not the sound economic basis on which a great industry should depend for its raw material.

These are considerations we are apt to lose sight of when we fill up the flivver with 15-cent gasoline or, as technologists, study the chemical engineering problems of oil refining. Nevertheless they lie at the very basis of our industrial enterprises. In the case of oil shale, where the industry is yet in a formative stage, it is especially important that we make sure that sound economics as well as good technology forms the foundation for future development. — *Chemical and Metallurgical Engineering.*

West Coast Dealers Side with Portland Cement Producers Against Importations

AT the closing session of the annual convention of the California Retail Lumbermen's Association, held in Los Angeles, November 7 and 8, a resolution was adopted approving the action of certain southern California cement manufacturers charging 25 cents per barrel more for cement f.o.b. trucks than f.o.b. cars at the mills. The resolution urged retail dealers to order cement by the carload rather than by the truckload.

A resolution was also adopted by the lumbermen declaring that, inasmuch as the importation and use of foreign cement is proving detrimental to the California cement industry, in which many millions of dollars are invested in plants which are among the largest employers of labor, "we use every legitimate effort to promote the use of California-made cement in California construction."

Who Pays for Quarry Accidents?

An Important Question in Which Employer and Employe Are Interested

By R. N. Van Winkle
General Manager, Hawkeye Quarries Co., Cedar Rapids, Iowa

SOME PUBLICITY has been given of late to the question of workman's compensation, or employer's liability insurance and the rates applying to the quarry industry, but in most instances mere mention has been made of the question with the suggestion that something must be done. As a general rule everybody's business, as we know, is nobody's business and the writer has found that one can't dream one's projects to success, but only by action can things be accomplished.

Safety work, our medium for combating accidents, has many and varied phases, but the two in which the employer, employee and the public at large are most vitally interested are, first, the moral or humanitarian phase and next the financial phase. All of us are sold unquestionably on the humanitarian phase of safety work; our sympathies and aid go out to hopeless cripples and fatherless children, which to a great extent are due to industrial accidents traceable in most instances to neglect, but it is with the next or financial phase that your attention as employers and quarry operators should be especially directed at this time.

Workmen's compensation is today compulsory in practically every state in the Union and the rates on workmen's compensation are rapidly advancing, owing to the fact that laws are continually being passed giving greater benefits to the employe. What happens when a man loses an arm or leg in an industrial accident which could have been prevented if care and precaution had been taken? The employer pays; the employe pays, because no amount of compensation that he receives can replace the lost arm or leg; industry pays in the form of increased cost of production, and the people as a whole pay because they must assume and share the increased burden.

Cost to the Employe

One will readily realize it is not only the employer, but the employe who pays. Take, for example, John, who is a skilled mechanic or worker at his line and who has an average wage of $42. Through carelessness on his part, or even if through some other cause, he meets with an accident that disables him for four weeks. The weekly pay check stops the first and second week, but the third week he receives approximately $15 weekly benefit provided by the workmen's compensation law. He also receives this check the fourth week. Now let us see how he stands financially as a result of the accident that no doubt would have been avoided if we were all more careful. Had the accident not occurred to John he would have received four weekly checks of $42 each, making a total of $168, but instead he received only his benefit under the law, which was $15 for the third week and the same for the fourth week—a total of $30. He is out just $138.

Present Rates Excessive

In my judgment the quarry operator and owner is being what might be termed discriminated against when it comes to compensation insurance and is paying now an excessive rate for such insurance with the prospects of a still higher rate in the immediate future. Some underlying causes of this excessive rate charged quarry operators and owners are: First, no one insurance company is at present carrying enough of such risks to obtain comprehensive experience; that is to say, records of the number of deaths and injuries which occur and the amount of money paid as compensation on which to base such rates or premiums and therefore the insurance companies are charging the highest rates quoted in their manual for quarrying, including stone crushing. I do not believe there is any definite experience data available pertaining to quarrying on which rates can at present be based; the quarry industry is being penalized by high rates and premiums by excessive loss ratios in the past. The insurance companies, as well as the operator, are groping in the dark so far as rates are concerned for compensation insurance for the quarrying industry, and it would be a most interesting thing to have our National Crushed Stone Association mail our questionnaires to each quarryman ascertaining the rate he is paying for workmen's compensation insurance. The company insured with is not necessary to be given in this questionnaire, just the rate charged per $100 of pay roll. I'll wager the returns would show as many different rates as the proverbial yellow dog has fleas and show that we are groping in complete darkness.

Time for Quarrymen to Co-operate

To reduce the foregoing to plain quarry talk the insurance companies are in the same boat as the quarry operators who do not have a cost system. They put the rate on workmen's compensation as high as they can and at the end of the year, like the quarryman without a cost system, they find whether they have made or lost money. If they have made they say little, but if they have lost they raise the rate as the quarryman raises the price, or cancel the insurance and go out of the quarry compensation insurance business, as the quarryman does who closes his plant and seeks other fields of endeavor. The writer personally knows of one insurance company which last year cancelled 12 quarry risks. Is this a healthy condition for the quarry operator or owner who expects to stay in business and buy insurance?

It is a simple and easy matter to criticize and find fault, but what we are particularly interested in is a solution of these conditions regarding workmen's compensation insurance, which unquestionably exists and confronts us. Let us stop, look around and see if the quarry industry is the one business that has been singled out and is the only industry that has been called upon to pay excessive rates or premiums for insurance. A short while ago we were not alone groping in the dark, for the coal mine operators and even the bankers were in our same class. The coal mine operators, not as a complete unit, but in some districts, have overcome the payment of excessive rates by grouping their insurance and placing it with one company. The bankers have gone the coal mine operators one better and to obtain burglar insurance at a fair rate they have banded together, formed an insurance company and are carrying their own risks. In the case of the mine operators they, by their grouping of insurance and placing it with one company, obtained for themselves greatly reduced rates, owing to the fact that the company receiving this insurance was able to specialize on this class of risk, obtain dependable experience data on which to base rates, reduce or maybe eliminate the agent's commission and cut down the overhead expense. As for the bankers with their own company, they eliminate the agents' commission and practically do away with the overhead charge. Just what these two items, agents' commissions and overhead expense, mean to buyers of workmen's compensation insurance I am told is this: The agents' commission ranges from 15 to 17½% of your premium and the overhead is from 15 to 35%, so an average for agents' commissions and overhead charge is approximately 41%. This means for every $100 of premium paid you actually receive $59 of actual coverage; no, not $59, for it must be remembered there is a profit to the

insurance company. We will take this profit, for argument's sake, as I do not know exactly, at 10%; well then we are getting $49 of actual coverage per $100 of premium paid. Now it is quite evident that when the insurance company pays out $49 or more for losses per $100 of premium paid in they are going to cancel your workmen's compensation or raise your rates, and that is precisely what they have done and are doing.

What Concerted Action Can Do

The quarryman has the reputation of being "a glutton for punishment" and when it comes to rates on compensation insurance I think you will agree with me, he rightfully deserves it. We quarry operators, and I say we, because the writer is one himself, are only a handful and a small handful at that, but if we knew how powerful concerted action on our part would be in a case such as it has been my endeavor to place before you, we would act, and collectively, for it is within our rights and within our power to remedy the present condition of affairs as to workmen's compensation in the quarry industry.

There is absolutely no desire on the part of the writer to convey or prompt any bitterness or animosity in the minds of his readers towards any insurance company, but the subject is one he feels is worthy of consideration and a matter that can be easily and amicably remedied and properly adjusted directly with the insurance people themselves should we as a whole elect to take proper action.

The action necessary is to decide whether we should form a mutual company of our own and save the commissions paid to agents and the high overhead expense, thereby keeping the full premium dollars in our own funds for the payment of loss, claims, etc., and return any savings we may have to members, or shall we select some one company as our official carrier and in this way bring about a substantial reduction in our insurance cost on workmen's compensation?

Old Vermont Slate Quarry to Be Opened

FIRST steps in the actual revival of the long defunct slate industry of Northfield, Vt., will be taken next summer, W. W. Holden of South Northfield announced. Two Granville, N. Y., men, whose names are withheld from publication for the present, will open one of the quarries in South Northfield operated some 20 years ago by the Vermont Slate company. The lease which they have signed calls for the commencement of work July 1.

Almost half a century has elapsed since the time that the slate industry there flourished to the extent that it held out great promise for the future. Realizing that a wealth of black slate lies in Northfield's east hill, interested parties for several years now have endeavored to restore to life the old industry.—*Whitehall (N. Y.) Times.*

Louis Laun, Prominent Sand and Gravel Producer, Dies

LOUIS LAUN, a pioneer in the development of the good roads industry of Wisconsin and an outstanding figure in the commercial life of the state, died at his home in Elkhart Lake, Wis., December 25, 1924. Mr. Laun was born in the Town of Rhine on August 15, 1865. He attended school in Dodgeville, Wis., and also attended Mission House College at Franklin, Wis.

As president of the Wisconsin Rapids Sand and Gravel Co. and secretary and treasurer of the Elkhart Sand and Gravel Co. he became well known for his efficiency as a designer and manager of model sand and gravel plants.

Mr. Laun attended the meeting of the Wisconsin Mineral Aggregate Association held just a week prior to his death and was re-elected for the sixth time as a director of that body.

Mr. Laun was connected with many business concerns. He was president of the Bank of Elkhart Lake, president of the Laun Lumber and Furniture Co., vice-president of the Kiel Furniture Co. of Milwaukee and Kiel, secretary-treasurer of the Elkhart Lake Realty Co. and president of the Quit-Qui-Oc Golf Club.

He was also an extensive traveler, having visited practically every state in the union. He was well known in social circles. He was a member of Lodge No. 57, Benevolent Protective Order of Elks, the Chamber of Commerce of Milwaukee, the Hoo-Hoo's (fraternal Lumbermen's Association), Modern Woodmen of America and Engineering Society of Wisconsin.

Deceased is survived by his wife at Elkhart Lake; daughter, Mrs. Harry M. Swartz, of Berkeley, Calif.; three sons, Harold, a student of the University of California at Berkeley; Arthur H. Laun of Milwaukee and Lester L. Laun of Elkhart Lake.

Idaho Asbestos Plant Begins Production

THE milling plant of the Panhandle Asbestos Co. at Kamiah, Idaho, is one of the most modern in the country and will be in operation early in December, according to A. C. Spengler, vice president and general manager.

"We are spending between $40,000 and $50,000 on this plant and will have it in operation early in December," said Mr. Spengler. "We will have a capacity of 10 tons an hour.

"We have in mind low cost of operation and this will allow us to place our product on the market at a lower price than any asbestos concern in the country and we will still be making a satisfactory profit.

"We have paid little attention to marketing our product as there are so many inquiries already on file that we have no fear about the selling end. We have inquiries from Holland, Japan, Australia, Germany and practically all the large centers of the United States where asbestos is used."

Connecticut Quarries Company Is Reorganized

THE controlling interest in the Connecticut Quarries Co., New Haven, Conn., has been purchased by Dennis A. Blakeslee and Clarence Blakeslee, prominent contractors, and also the principal stockholders in the New Haven Trap Rock Co., of New Haven. The name of the new organization will be the same—The Connecticut Quarries Co., Inc. B. D. Pierce, Jr., president, and Albert L. Worthen, vice-president of the Connecticut Quarries Co., in charge of production, will continue to serve in the new organization.

We are informed that some changes will be made in the executive offices, otherwise the new organization will continue to do business in the same offices and along the same lines.

New Deposit of Diatomaceous Earth Opened in California

A NEW deposit of material used in the production of heat insulation and filtration products has just been acquired at Lompoc by the Feather-Stone Insulation Co. of Los Angeles. It is now being developed and will soon be in operation.

This deposit is a chalk-like material of siliceous nature, composed of the remains of skeletons of aquatic plants. Of the few known deposits of high grade quality, the Feather-Stone Insulation Co. have two. The new deposit at Lompoc consists of 1500 acres. The other is a deposit of 500 acres at Covina, Calif., where a well equipped plant has been erected and in operation for some time.

The mining and manufacturing of heat insulation materials is one of the newer industries of southern California. The Feather-Stone Insulation Co., who have been doing intensive research work and standardizing their products for the past five years, are now marketing their products both here and in eastern and foreign markets.—*Los Angeles Examiner.*

Find Indian Skeletons and Relics in Wisconsin Gravel Pit

TWO skeletons, supposed to be those of Indians, were unearthed at Wilmot, Walworth county, Wis., recently in a new gravel pit. One disclosed an arrow head imbedded in the first lumbar vertebrae, showing he had been killed in this manner. Indian pottery was also unearthed at the same time.—*Geneva, Illinois, Republican.*

Book Review

Second Edition of Lindgren's Mineral Deposits

"MINERAL DEPOSITS," Second Edition, by Waldemar Lindgren, professor of economic geology, Massachusetts Institute of Technology; formerly geologist, United States Geological Survey. Cloth, 957 pp., well illustrated. McGraw-Hill Book Co., Inc., 370 Seventh avenue, New York.

IN the revised edition of Mineral Deposits the author has not only brought the first edition up to date but has added two features, a chapter on metallogenetic epochs and an index of elements, which will better enable the reader to co-ordinate all the deposits of any given metal.

As in the first edition, Professor Lindgren has held to the genetic or "how they are formed" method of classification. Furthermore, he has refrained from separating the metallic from the non-metallic. In this way he has presented his subject in the most logical manner. The adoption of this method is Professor Lindgren's great contribution to the study of ore deposits.

There are two broad classifications as follows:

(1) Deposits produced by mechanical processes of concentration.

(2) Deposits produced by chemical processes of concentration.

A. In bodies of surface waters.
B. In bodies of rocks.
C. In magmas by process of differentiation.

These groups are so subdivided that every known deposit is classified in as specific a manner as is possible. This allocation is by genetic rather than by geological era or geographical location. Both of these groups represent a tremendous amount of research work and study on the part of the author.

The first few chapters are devoted to a review of the fundamentals of geology, although the author does not omit specific mineral deposits when he is describing the various formations or actions. This part of the book closes with a classification of the various deposits which are then fully treated in the following chapters.

To the quarryman perhaps the most interesting part will be that which deals with the importance limestone plays in the formation of ore deposits. Sometimes a lime producer may wonder where the chert in his limestone comes from. The subject of circulating silicified waters will throw considerable light on that puzzling question.

The chapter on metallogenetic epochs is especially valuable, as it is really a detailed cross-index of mineral deposits, geological eras and geographical locations. Thus the reader is able to visualize the many changes that have occurred and to correlate one with the other. In this chapter is also included the index of elements and mineral deposits with page references to the main chapters.

Professor Lindgren has been generous with photographs, thus enhancing the value of the reading matter. An excellent bibliography is included.

To the mining engineer this book is indispensable. Naturally, the greater part is devoted to ore deposits rather than to the rock formations with which the stone or sand producer is familiar. Yet there are many in our industry who are seriously interested in geology and the mineral deposits which lie outside of their own particular field and it is to these that this book is commended.—A. B. S.

A Book on Glass Sand

GLASS MANUFACTURE AND THE GLASS SAND INDUSTRY. Report No. XII of the Topographic and Geologic Survey of Pennsylvania. By Charles Reinhard Pettke, Ph.D.; 278 pp. Paper, with many maps, diagrams and illustrations. Published by J. L. L. Kuhn, Printer to the Commonwealth, Harrisburg, Penn.

THIS report is one of the most complete works on the glass sand industry and glass making which the writer has noted. Every branch of the subject is taken up and well handled—geology, mining and preparation of the sand and the details of glass making. Furthermore it has the advantage of being written in a very clear and readable style and the arrangement is excellent.

The geology of the different deposits in the state is very well handled, the maps and sections being clear and easily understood. Discussing the theory of the formation of glass sand deposits, the author has introduced some material that is new, to the reviewer at least, in his use of present day examples of sand formation and deposition to show the processes involved. It is interesting to learn that a deposit of 99% silica sand is forming near Tampa, Fla., and to see how the effect of the winds in producing stratification and cross bedding in Arizona today is the same as it was when it produced the deposits now known as the St. Peter sandstone.

Preparation of the sand is explained by numerous examples of sand washing and drying plants with flow sheets. The various machines are well described and illustrated and the description is that of an unprejudiced observer. Silica sand producers, wherever located, will find this valuable reading.

The details of glass making are perhaps not so important to silica sand producers, but glass making is a subject that they ought to know, in the same way, and for the same reasons that the producer of concrete aggregate should understand the theory of designing concrete mixtures. So these chapters have a value of their own to the sand producer who should study them to understand the reasons for the specifications by which his product is bought and sold.—E. S.

An Excellent Book on Geologic Structures

GEOLOGIC STRUCTURES. By Baily Willis, Professor Emeritus of Geology in Stanford University. Cloth, 295 pp., well illustrated. Published by the McGraw-Hill Book Co., Inc., 307 Seventh avenue, New York.

STANFORD UNIVERSITY has always been strong in its geological courses so it is not surprising that so excellent a book as this should come from the pen of one who has been so closely connected with the teaching of geology there. The book is especially valuable to those who have no great knowledge of geology but who are anxious to acquire more for, while the book is an advanced treatise, Professor Willis has tried to present the subject simply ("in English rather than Geology," to use his own words) and he has succeeded in doing so. The non-technical reader will find it not only easy to read but interesting.

The illustrations are excellent. Most of them are drawings, for the sake of clearness, and they are very well done. Too often one sees drawings representing faults and earth structures which are confusing from the number of lines that are used, but these are simple, contain only the essential lines, and are shaded in such a way that one gets the three-dimension effect at a glance.

Professor Willis is also widely known as an authority on geologic structures from his work with the Geological Survey incorporated in "Mechanics of Appalachian Structure," a part of which is included in this volume.

Engineers who have to deal with the structure of the earth's crust in their work will find this book interesting and profitable. —E. S.

Report of Vermont State Geologist

REPORT OF THE STATE GEOLOGIST ON THE MINERAL INDUSTRIES OF VERMONT. (Thirteenth of this series.) By George H. Perkins, State Geologist and Professor of Geology in the University of Vermont. Bound in boards, 342 pp.

IN this, the thirteenth of the series issued by the state geologist, Professor Perkins has contributed a historical summary of Vermont geological work and a chapter on its mineral resources. The other papers are: Preliminary Report on the Ordovician Formations of Vermont, by Edward J. Foyles; Preliminary Paper on the Fault Systems of the Northern Champlain Valley, by George H. Hudson; Geology of Westmore, Brownington and Charleston, by Elbridge C. Jacobs; Geology and Petrology of Randolph, by Charles H. Richardson and Charles K. Cabeen; Studies on the Geology of Western Vermont, by Clarence E. Gordon, and Progress of Stream Gaging in Vermont, 1920-1922, by C. H. Pierce.

Editorial Comment

Sand and Gravel Convention

The annual sand and gravel convention is over and ROCK PRODUCTS is sure that every member who attended went away stimulated and enthusiastic—which is an excellent frame of mind in which to begin the business of the coming season. Reviewing the work of the convention in one's mind gives one the conviction that no previous convention has had such an important bearing on the future of the industry. For everything that was done tended toward the advancement of the industry as a whole.

President Prince's opening address gave this keynote of advancement and the remaining speakers held it. Mr. Wright's talk on "Winter Construction" was one that not only showed progress but indicated great possibilities in the future. Mr. Ford's talk on "Railroad Ballast" was straight from the shoulder. Perhaps he asked for something impossible to get when he called for a standard gravel ballast specification, but we are sure that the producers who heard him will make better ballast and take a greater interest in its making than they had before. Mr. Boulay's talk on highway problems was clear and sensible and gave producers some things to think about. And the papers by various members and the discussions in the "experience meeting" were short and full of meat, as the reader may see for himself by reading them in this issue.

The number of members interested in concrete products surprised those of the producers who had not studied the growth of the cement products industry. As Mr. Dienhart said in his address, the cement products industry and the sand and gravel industry are firmly welded together from the very natures of their business. It is quite easy to see that the cement products division of the National Sand and Gravel Association is bound to be of the greatest importance to both industries.

It was a good decision to hold the convention in Chicago, for while the custom of the association of holding its convention in a different city each year has many advantages, it remains true that Chicago is a most convenient point for producers to reach and a large attendance will result when the convention is held there. And a large attendance was important at this particular time.

The excellent printed programs prepared by Mr. Barrows and distributed in advance ought to be mentioned, as they added much to the convenience of the members. All the information that a member or guest needed about the convention, railroad rates and the like was included, as was Mr. Barrows' own annual report. A study of this report ought to be enough to convince any producer of the value of the association to him and undoubtedly the reading and the study of this report caused a number of those who "exchanged red badges for blue" to become members of the association.

We have commented elsewhere on the decision of the association to enlarge its educational and technical work, but think it fitting to voice the approval of ROCK PRODUCTS in this place. It is only by such work that all the rock products industries can advance to the position of importance that they should hold in the national mind. Such work can never be done by unassociated individual producers. Rock products industries are too local in their nature for any producer, however large, to cover the whole country. It is only by constant and steady effort on the part of the national associations that the importance of the industry and the ability of the producers to turn out a product adapted to the highest uses of modern construction may be brought before the people. The work of the National Sand and Gravel Association, from its intimate relation to our good roads and general construction programs, has become of the highest importance to the whole country. A recognition of that importance is what the work of the association should secure.

Parallel Roads

It is being pointed out by motor papers that the saturation point of automobile ownership will not be reached either from the inability of people to buy cars or for the lack of fuel with which to run them. Rather it will come because of a lack of roads on which to drive them safely. It is recognized that congestion in cities has gone about as far as it can and engineers are talking about upper and lower levels of traffic as a measure of relief. But there is also a congestion on main highways in the country, especially those which connect nearby cities or those which link a big city to a popular resort. On some of these roads traffic is so dense that the pleasure of a day's outing is spoiled and a drive from one big town to another involves about as much strain on the nerves as the piloting of a car through a crowded city street. It is evident that this condition must be remedied, and the obvious remedy is to parallel those highways in which traffic is so congested. These parallel roads, of course, will not be strictly parallel but will be alternative roads passing through another part of the country and introducing new sections to the advantages of good highway transportation. For congestion at focal points there seems to be no remedy except that of putting traffic on higher and lower levels, but away from these points the building of parallel routes is only a question of finding the money which is sure to be forthcoming whenever the public demands them.

Distinguished English Constructor Visits America

SIR EDWIN AIREY, formerly Lord Mayor of Leeds, sailed for England recently. With Lady Airey and their two daughters he had just completed a short trip to this country to view concrete roads, buildings and cement plants. His trip was in the nature of a return visit to the American cement manufacturers who last fall visited his city, to present Leeds with a tablet commemorating the one hundredth anniversary of patenting portland cement.

F. W. Kelley, president of the Helderberg Cement Company, who while president of the Portland Cement Association made the dedication speech in Leeds, was host to Sir Edwin during his trip through the east and while in Albany.

Sir Edwin brought with him photostatic copies of the original patent granted Joseph Aspdin by George IV in 1824. One copy will find permanent place in the library of the State University at Albany. Other copies will be given to the American Society of Civil Engineers and to the National Library at Washington, D. C. The copies are the same size as the originals—3 ft. wide and 2 ft. high. Each has the king's seal attached which is six inches wide and three-quarters of an inch thick.

Sir Edwin was knighted in 1922. During the war when housing conditions in England were most acute and building operations exorbitant in cost, he proposed plans for governmental subsidized home building. In Leeds alone more than 800 houses were built and throughout the empire more than 4,000 concrete houses of the "duoslab" system were erected under government subsidy co-operation. It was this program that gained for Sir Edwin his knighthood.

A builder himself, being interested in a large construction company, he was particularly attracted by our concrete road systems. Commenting on concrete roads in Illinois and the east over which he motored, Sir Edwin said, "The only thing I can say about them is that because they are so good, I don't see why you do not build far more of them." After inspection trips around Chicago, New York and Washington he expressed himself as thoroughly convinced of the superiority of this type of road. In his estimation it is the best type for the heavy travel and the great weights which roads here and in England are called upon to bear, and in England great progress is being made in increasing concrete road mileage.

Oklahoma Increases Cement Production

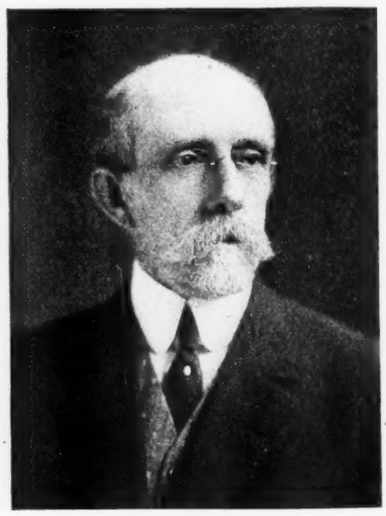
ACCORDING to figures issued by Charles N. Gould, director of the Oklahoma geological survey, the production of portland cement in Oklahoma increased from 1,800,000 bbl. in 1922 to 2,000,000 in 1923. The value of the product, however, remained the same, $3,000,000.

John B. Lober

JOHN B. LOBER, president, Vulcanite Portland Cement Co., and one of the best known men in the industry, died at his home in Wynnewood, Penn., Sunday, December 21, 1924.

Mr. Lober had not been in robust health for several years, but nevertheless was able to visit the headquarters office of his company in Philadelphia, attending regularly to his executive duties with the company of which he for so many years was president.

No other man in the industry could be more loved by everyone connected with it, and his loss will be keenly felt by a host of friends. The funeral was held Wednesday, December 24, at Wynnewood.



John B. Lober

Mr. Lober was born in New Jersey in 1848. From 1877 to 1883 he was a member of the firm of Warren, Lober & Co., distillers of coal tar and manufacturers of coal tar products. From 1883 to 1901 he was vice-president of the Vulcanite Paving Co. In 1894 the Vulcanite Portland Cement Co. was incorporated, Mr. Lober being one of the original incorporators. Four years later he was elected vice-president and general manager of the company, and president in 1903, which place he continued to hold until his death.

Perhaps Mr. Lober was best known in the cement industry for his long time service as president of the Portland Cement Association. He held this office continuously from 1903 to 1909, accepting re-election in 1912 and serving a second period as president until 1915. It was largely through Mr. Lober's initiative that the original call to cement manufacturers was issued in 1902 that soon resulted in the organization of the Association of American Portland Cement Manufacturers, which later became known as the Portland Cement Association.

President Blaine S. Smith of the Portland Cement Association appointed the following committee to represent the association at the funeral: R. W. Lesley (chairman), W. S. Mallory, B. F. Affleck, L. T. Sunderland, F. W. Kelley, John Barnes, George S. Bartlett, G. S. Brown, Charles F. Conn, Morris Kind, John R. Morron and E. M. Young.

One of the last contributions which John B. Lober made to the portland cement industry covered a period of nearly two years of work in collaboration with R. W. Lesley and George S. Bartlett in compiling personal reminiscence and data and historical facts relating to the development of the portland cement industry in the United States. These data have recently been published by the International Trade Press, Chicago, as a "History of the Portland Cement Industry in the United States."

Minnesota Considers Building State Cement Plant

MEMBERS of the Minnesota legislature interim committee on a state-owned cement plant are reported to be awaiting the arrival of a report on the South Dakota state mill at Rapid City, before completing their report with recommendations to be submitted to the next legislature. The interim committee members are to be guided in their conclusions largely by the experiences of South Dakota with their state-owned project. Members of the committee are Senator Michael Boylan of Virginia, chairman; Representative Frank E. Nimocks of Minneapolis, vice-chairman; Senator E. W. Cameron, of Minneapolis; Representative Carl M. Iverson of Ada and former Representative Elias Nordgren of North Branch. The report of the present interim committee will conclude four years of study on the question of whether Minnesota should build and operate its own cement plant for road building purposes. An amendment to the state constitution is necessary before the state could actually undertake the work. The question of state ownership and operation of such an enterprise is entering into the deliberations of the committee, inasmuch as the voters in the November election turned down decisively the proposed amendment which would have enabled the state to acquire and operate two terminal grain elevators.—*The Improvement Bulletin, Minneapolis, Minn.*

Washington Has Lowest Cement Price in 46 States

THE price of cement in Washington is lower than in 46 of the leading centers of the United States. This statement is made in refutation of statements recently made to the effect that the state, the city of Seattle, and other users of this material have been charged by local manufacturers more than other sections have paid in the recent past. The facts are stated in reports of the federal department of commerce.—*Seattle Post-Intelligencer.*

Lime Rate Case Finally Decided

Projected Increase in Rates Has Been Canceled in Famous Mitchell Rate Case

A BASIS for constructing rates on lime, from points in eastern trunk line territory to destinations in 60 and 67 per cent territories, and from Mitchell, Ind., has been ordered made effective not later than March 20, by means of a report and order in I. and S. No. 2096, Lime from Eastern Trunk Line Points to Pittsburgh, Youngstown and Related Points, mimeographed, written by Commissioner Campbell. The proposed increased rates were found not justified and ordered to be cancelled, without prejudice to the naming of rates in accordance with the basis pointed out. It was found necessary to modify the findings in Lehigh Lime Co. vs. Akron, Canton & Youngstown, 85 I. C. C. 341, called throughout the report, the Mitchell case, because it had to do with rates on lime from Mitchell, Ind.

The condemned schedules proposed an increase in rates from lime kilns in Pennsylvania, West Virginia, Maryland, Virginia, New Jersey, New York and Vermont to destinations in Pennsylvania, Ohio and West Virginia in so-called 60 and 67 per cent territories, the groups in which large steel mills and other big users of lime are situated. They were published following the decision in the Mitchell case in which the Commission found rates from Mitchell to destinations in central territory, in Michigan, Ohio, Pennsylvania and West Virginia unduly prejudicial to the complainant and unduly preferential of competitors at Buckeystown, Frederick, Grove, and Lime Kiln, Md.; Bakerton and Engle, W. Va.; Stephens City and Strasburg, Va., and York, Pa. Lime shippers at the Eastern points, Mr. Campbell said, were not represented at the hearing in the Mitchell case. The Commission in that case prescribed a distance scale to be used in the removal of the undue prejudice with an injunction to make rates from the eastern points which should bear the same relationship to the rates from Mitchell, on the one hand, and of specified rates from the eastern points, on the other. The specified eastern rates were all on a group basis, origin points being treated as in one group and the destinations in the two percentage groups. The rate to the percentage groups was made 19 cents, while to points in other percentage groups the basic rate was made 28 cents and scaled down by the appropriate percentages.

Commissioner Campbell said that in complying with the order the carriers observed the criteria set forth. In addition, they published rates from other eastern points of origin to the destination territory. It allowed rates to groups west of the 67 per cent group and from Mitchell to go into effect. The rates to 60 and 67 per cent groups it suspended. The basis prescribed in the Mitchell case yielded somewhat higher rates than had been in effect, on some kinds of lime, because, prior to that time the carriers had made a distinction between agricultural, building and fluxing lime. Under the Mitchell scale and the proposed rates all lime was treated alike. The suspended rates were higher than the Mitchell rates, to Pittsburgh, 19 cents being blanketed from all points of origin, in place of rates ranging from 12 to 17.5 cents. To Youngstown, in 67 per cent territory, the present rates are from 1.5 to 4 cents higher than to Pittsburgh.

The carriers relied upon the Commission's report and order in the Mitchell case, regardless, Mr. Campbell said, of the fact that to the two percentage groups containing the big users the average hauls were relatively short in comparison with hauls to other points in central territory. Under the conditions shown, Mr. Campbell said the decision could not be regarded as immutable, especially in view of the more comprehensive record as to eastern rates. In brief, he said the carriers conceded 19 cent rate to Pittsburgh might be too high and suggested a rate of 16.5 cents from the Baltimore and Williamsport groups to Pittsburgh proper with 17 cents to other points in that group and 19 cents to 67 per cent territory.

Ohio interveners, having rates as high or higher than the Mitchell scale, said they had difficulty in marketing in 60 and 67 per cent groups and said the lower rates from eastern points put them at a disadvantage. They said the proposed rates would remove the undue prejudice against them and their lime, which the report indicated was a high grade finishing lime that might be used in competition with the lower grades from the east.

Commissioner Campbell said that the proposed rates would violate both clauses of the fourth section because no increases were proposed from certain Virginia producing points through which lime from the eastern producing points could and probably did move.

The Commission said there was no uniformity or consistency in the rates in trunk line territory or from that territory to the percentage groups. In disposing of the case the Commission after finding that the increases had not been justified said:

We further find that the interstate rates on lime, in carloads, except lime which has no generally recognized commercial value for chemical or building purposes, from points found to be unduly preferred in the Mitchell case, namely, Buckeystown, Frederick, Grove, and Lime Kiln, Md., Bakerton and Engle, Va., Stephens City and Strasburg, Va., and York, Pa., are, and for the future will be, unduly preferential of lime producers at those points and unduly prejudicial to intervener, Lehigh Lime Co., to the extent that the rates from those points to destinations in central territory in Pennsylvania, Ohio, and West Virginia in the percentage groups known as 60 and 67 per cent territories fail to bear the following relationship to the contemporaneous rates from Mitchell, Ind., to the same destinations:

"From Buckeystown, Frederick, Grove, Lime Kiln, Bakerton, Engle, Stephens City, Strasburg, and York, as follows: 16.5 cents to Pittsburgh and points in the Pittsburgh district; 18 cents to Youngstown, Sharon, Steubenville, Wheeling, and Erie; and rates to other points in said destinations territory that will be in harmony with the rates to the points above specifically named.

"From Mitchell, on the basis prescribed as reasonable in Lehigh Lime Co. vs. A., C. & Y. Ry. Co., supra."

Our findings in the Mitchell case are hereby modified accordingly. We further find that rates constructed on the above basis will be just and reasonable.

In reaching the above conclusion with respect to the eastern producing points involved in the Mitchell case, we have taken into consideration the related eastern producing points in the Baltimore and Williamsport rate groups embraced in the suspended schedules. In making the necessary revision from the latter points, the rates on lime as above described should not exceed the following:

From	To Pittsburgh Cents	Youngstown, Sharon, Steubenville, Wheeling and Erie Cents
Group 1 Points as hereinbefore described	13.5	15.5
Group 2 Points as hereinbefore described	15	17
Group 3 Points as hereinbefore described	16.5	18

With respect to traffic from points east of Group 3, including Baltimore, Md., and points differentially related thereto, no reason is apparent on this record why the present destination grouping should not be continued, subject to maximum rates from Baltimore of 18 cents to 60 per cent territory and 19 cents to 67 per cent territory.

We make no finding as to the reasonableness of the present rates on so-called agricultural or fluxing lime which has no generally recognized commercial value for chemical or building purposes.

The suspended schedules will be ordered can-

celed, without prejudice to the establishment of revised rates not inconsistent with our conclusions herein. Such revised schedules should be free from the violations of the act alluded to in this report.

As above pointed out, the rates from Ohio producing points to this destination territory are in many instances on a higher basis than that which would obtain under the Mitchell scale, but it is impossible on this record to grant any affirmative relief to the Ohio interveners with respect to such rates. However, the establishment of rates from the eastern points in accordance with our conclusions herein will go far toward removing the alleged undue prejudice against these Ohio producers.

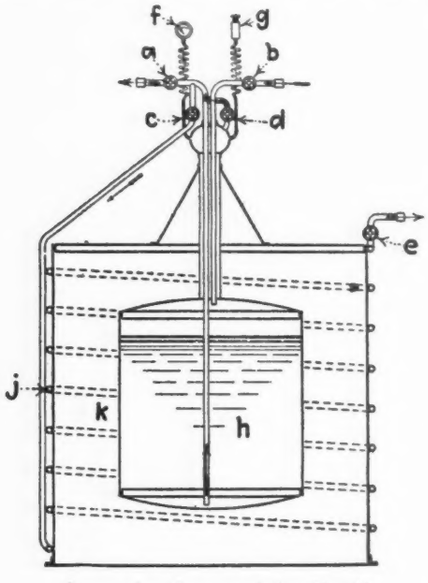
Since the hearing in this proceeding, formal complaints, docketed as No. 16170, Eastern Lime Manufacturers' Traffic Bureau et al. vs. Akron & Barberton Belt Railroad Company et al., have been filed, which present a general attack on the rates on lime from points in Ohio to destinations in central territory and from points in trunk line territory to destinations in the various percentage groups, including 60 and 67 per cent territories. It should be understood that our conclusions herein are without prejudice to different conclusions which may be reached in those cases.

An order will be entered requiring the cancellation of the suspended schedules and also requiring the establishment of an adjustment of rates to the destination territory under consideration in accordance with our findings in the Mitchell case as modified herein.—*Traffic World.*

Handling Liquid Oxygen

IN view of the fact that liquid oxygen has already been successfully used for blasting in quarry work, the following description of an apparatus for transporting and handling it may be interesting. It is taken from *Chemical and Metallurgical Engineering.*

Paul Heylandt of Berlin-Sudende, Germany, has devised an apparatus for receiving liquid oxygen or other gas at an oxygen plant, transporting it to point of consumption and there serving as storage tank.



Apparatus for receiving liquid oxygen

Tank *h* is designed to hold from 300 to several thousand kilograms of liquefied gas. It is set in the middle of vessel *k*, the space between being packed with a non-oxidizable heat insulator such as slag wool. Tank *h* is filled through valves *b* and when in use is discharged through valves *c* and *e*. Liquid flows out through valve *c* and as it rises through coil *j* it vaporizes, absorbing heat from the slag wool surrounding tank *h* and thereby reducing evaporation in the latter. By setting valves *c* and *e*, gaseous oxygen, for example, may be drawn off through *e* at pressures of 2 to 15 atmospheres, the pressure remaining quite constant for any given setting. (1,505,095, August 19, 1924.)

Cost Figures That Help You Sell

By William R. Basset, President of Miller, Franklin, Basset & Co., Inc.

EVERY manufacturer realizes that when his plant operates at less than capacity the cost of his product rises. He cannot, however, raise prices to correspond with the costs. Rather, he lowers prices so as to get more work into the plant, and by enabling him to spread the overhead expense over more product to reduce his costs. In this way he attempts to get back the cost of labor and material plus a part of the overhead that goes on whether the plant is busy or not.

Usually the shading of prices for this purpose is done by guess work without a cost system properly designed for the purpose; if so the prices may be cut to an extent that makes the loss greater than it would be if the plant were shut down.

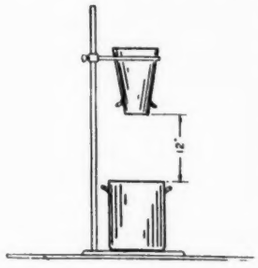
Informative figures can be obtaind without an unduly complicated cost system. It simply requires that a normal figure for each item of expense in a department be determined based upon the normal activity of that department.

Each month the normal and actual figures are compared. Those items which fluctuate with the activity of the plant are in one group and those which do not are in another.

Knowing accurately the labor and material cost of the product it is then possible to accurately determine what the result on profits will be if a given amount of business is taken at a given price. Unless you have such a method of forecasting costs, your cost system is of doubtful value as a guide in setting selling prices, for business is seldom exactly normal. Actual cost figures must therefore be aided by a knowledge of normals and abnormals.

Testing Sand for Bulking

SAND is tested for bulking (on account of moisture) by the simple apparatus shown at the side. The purpose of the device is to have the moist sand to be tested and the dry sand with which it is to be compared filled into the container with the same pressure.



The apparatus consists of a stand on the base of which stands a ½-cu. ft. container 12 in. deep. Exactly 12 in. above the rim of this is the bottom of a tin funnel, also 12 in. deep, 8 in. in diameter at the top and 4 in. at the bottom. A scale for weighing is also required.

The moist sand is poured through the funnel until the container is filled above the rim. Then the container is "struck off" and the sand and container weighed. Subtracting the weight of the dry container gives the weight of the sand.

The filling and weighing are repeated with the same weight of dry sand. The loss in volume may be measured and calculated to show the percentage of bulking, but a better way is to fill the container completely with dry sand and to weigh it and calculate from the weights of dry and moist sand to show the loss in volume.

As with all tests on sand, care should be taken to see that the container is dry and clean when taking its weight, and that damp sand does not stick to the container, scales and other things used in testing.

Moisture samples may be taken from the various samples tested for bulking and from these a curve may be drawn showing the relation between bulking and percentage of moisture. Bulking with 7% moisture will often run to 22%.

A New Bulletin on Lime Mortar

"THE Binder in Your Wall" is a publication of the National Lime Association on the use of lime mortar in laying brick and stone. It presents in a compact form a summary of the latest information on lime mortar. It is well illustrated and contains material of interest to all who build with brick or stone. The architect will be interested in the short form specification clauses, suitable for direct incorporation in his master sheets, and the contractor will welcome the handy tables.

Copies of this bulletin may be secured without cost upon request from the National Lime Association, 918 G street, N. W., Washington, D. C., the division offices, or from any member of the association.

Cement Products

TRADE MARK APPLIED FOR WITH U.S. PATENT OFFICE

Community Market Made of Cement Block

THE picture represents a community market house recently erected at Glendale, Calif., taken while construction was going on. The material used is "Stone-Tile" made under license from the National Stone-Tile Corporation. The style of architecture used so much in California seems particularly adapted to cement products construction.

Community market in Glendale, Calif., made from concrete block

Control of Quality in Tile and Block Manufacture

COMMITTEE P-6 of the American Concrete Institute on concrete products plant operation, John Lowell, chairman, expects to present at the February meeting a "Recommended Practice for Concrete Building Unit Manufacture," replacing the practically obsolete standards of the institute on this subject with new material embodying our latest knowledge of the control of quality concrete in products manufacturing operations.

From Chairman Lowell we have this as to the committee's work:

"We are pleased to state that we have started on a very live program. We fully hope to complete the program in time to present a comprehensive report on the tests that are being conducted at the next meeting of the institute. Tests on concrete building tile are to be conducted at Humboldt, Iowa, to learn:

"(1) Economic range of mixes for light building tile.

"(2) Effect of method of mixing on the strength and density of concrete in light building tile.

"(3) Effect of retempering on the strength and density of concrete in light building tile.

"These tests were started on December 1 and will be completed by the 15th of January.

"Another series of tests has already been started on the effect of curing conditions on the strength of building block. These tests should be completed before the 1st of February. We are also making a study of available data on the subject of bulking of aggregates due to moisture content, and will apply this to the problems of the concrete products manufacturer. Another sub-committee is going over the recommended practice of making concrete building units, and we hope to be able to bring that up to date before the middle of January.

"The first series of tests mentioned above has been made possible by the co-operation of the Humboldt Gravel and Tile Co., Humboldt, Iowa, which company is donating the use of its plant, materials and labor, and will pay for shipping the specimens to Lewis Institute. The Structural Material Research Laboratory, which will do the testing, has very kindly offered to do this without charge.

"Bert Carey, contractor and products manufacturer, Forest Park, Ill., a member of Committee P-6, has made it possible for us to conduct the second series of tests. In order to prepare the plant for conducting these tests it was necessary for Mr. Carey to have installed special curing room equipment which he has done at his expense. He has also offered to donate the plant, materials and labor and transportation of the products to the Structural Materials Research Laboratory, where they are to be tested."—*News Letter of American Concrete Institute.*

Ohio Cement Products Makers to Meet

THE annual meeting of the Ohio Concrete Products Association will be held in Cleveland, Ohio, at the Cleveland hotel, January 13, 14 and 15, 1925.

It is very important that every concrete products manufacturer of Ohio make it his business to attend this meeting, for there will be a vital subject pertaining to his business thoroughly discussed, that is the proposed new Ohio state building regulations relating to concrete products. It will be decided at this meeting what action the Ohio Concrete Products Association will take in regard to this matter.

Use of Colored Cement in Concrete Products

THE view is becoming more generally adopted that from the point of view of the architect and from the artistic standpoint generally concrete should be regarded as an artificial stone and not an imitation stone. As a cast stone, concrete may be considered as a conglomerate of small stone (including sand) bound together with cement. This seems from every standpoint a legitimate expedient for the use of small stone as a constructional material, and the use of concrete in this sense should not offend reasonable taste. It is, indeed, where steps are taken to reveal the true nature of concrete by scrubbing the surface and exposing the aggregate embedded in a matrix of cement that the most pleasing effects are obtained. On the other hand, attempts to make concrete appear to be a solid homogeneous stone indistinguishable from natural stone, except on minute examination, are open to criticism on the ground that a sham is produced.

Upon first consideration it might seem that the use of colored cement would be banned by the æsthetic mind, but it has to be remembered that ordinary cement ranges in color from white to dark grey, according to the proportion of iron it contains, and there is nothing derogatory in adding other mineral compounds to bestow any other color or tint. The artistic treatment of concrete is indeed developing by the use of colored cements. The addition of coloring matters to concrete is of long standing, although largely confined to the use of oxide of iron to produce a red color. It is, however, a matter of great difficulty to obtain an even distribution of a colored powder with the other ingredients of concrete under the ordinary conditions of concrete mixing, and in the result a colored surface of irregular shade is frequently obtained. This factor has doubtless hindered the development of colored concrete, and hence the production of colored cement in which the cement and coloring matter are evenly mixed in the correct proportions to produce a desired shade is a step in the right direction and one that should popularize the use of color in concrete. It is in fact now possible to obtain colored cements in more than 20 different tints which can be chosen in the same way that decorative paint shades are chosen.

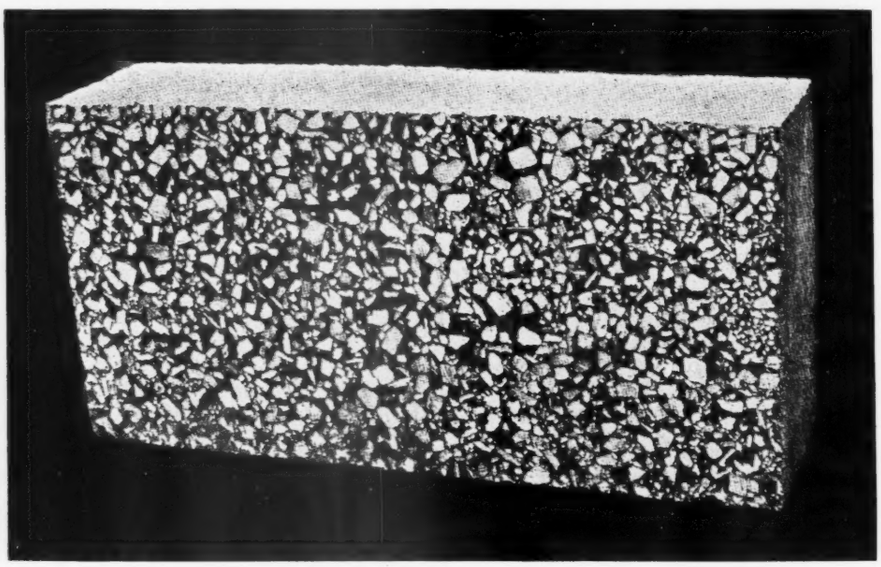
The introduction of coloring matter into cement requires to be done with discrimination, because owing to the alkaline nature of cement there are possibilities of chemical reaction occurring with certain materials which would cause the coloring to be evanescent and might lead to other undesirable results. The coloring materials must therefore be inert when in contact with cement and stable to the action of light and moisture. Generally speaking, metallic oxides are the safe materials to employ. Moreover, the coloring matters are in the form of finely-divided powders and the addition of fine powders to cement almost inevitably reduces the strength of the latter. Hence only a good cement should be used as a base for coloring, while the proportion of color added should not be excessive.

With light tints a high proportion of coloring matter would be needed to predominate over the grey color of cement, and in many cases white portland cement is used as the basis to avoid excessive proportions of added color.

It is indeed necessary from several standpoints that the production of colored concrete should not be done in a haphazard manner but under scientific supervision, and for this purpose it is desirable that the production of colored cements should be undertaken by the cement manufacturer who is best equipped with knowledge as to the coloring materials that can be safely added to cement and who also has the facilities for regular and intimate mixing.

As already indicated, the commonest color employed in concrete is red, produced by red oxide of iron, the latter being one of the cheapest coloring matters available. Red concrete tiles are probably the most prominet example of this, and red cement mortar may be used for pointing these or ordinary terra cotta tiles, while black cement mortar is used for pointing dark blue ridge tiles. One of the most modern examples of colored cement is for concrete tennis courts which are surfaced with green concrete, thus producing a surface which is not dazzling to the eyes of the players, as an ordinary concrete tends to be in bright sunlight.

When it is remembered that the colors available are red, yellow, brown and green, with numerous shades, and that white and black cements are also obtainable, it will be realized that the decorative possibilities of colored cements for floors, panels, roughcasting, etc., cover a wide range. In conjunction with colored aggregates it is possible to see unlimited scope for the artistic designer.—*Concrete* (England).



A handsome concrete block made of black cement and colored aggregate

How Detroit Concrete Block Manufacturers Have Standardized Product

THE Concrete Products Association of Detroit, whose members manufacture concrete blocks and building tile, have, through concerted effort, not only standardized their product as to kind, but what is of particular interest to the consumer, it has been standardized as to quality.

This association employs an engineering staff whose duty it is to pass upon the materials that enter into the various manufacturing processes and to see that quality is maintained at the source. Rigid inspection is continuously being made of the completed product.

M. E. Von Mach, Jr., a member of the publicity committee, in commenting upon such a practice, remarks:

"We believe it is a bit unusual for any organization to so jealously guard the quality of the finished product of its members in the same manner that the Concrete Products Association does, but as manufacturers we recognize that there is imposed upon us a certain responsibility, not only in so far as it relates to the general conduct of our business, but as it relates to the buyer or consumer as well.

"Standardizing our concrete products assures greater economies in manufacturing, and guarantees to the buyer an exceptionally high and unvarying quality.

"Any manufacturer is invited to join the association provided he is willing to conform to its requirements, which are maintained solely as a measure of insurance to himself and to those to whom he sells."—*Detroit (Mich.) Free Press.*

Montreal May Regulate Cement Products

ONE of the motions adopted at the meeting of the city council of Montreal, Quebec, concerns the civic regulations for the manufacture of building blocks. In bringing the motion before the meeting, Alderman Drummond reminded the council that the residents of Rosemount ward had had enough experience with flimsy construction material, and he mentioned an accident there where the side of a house had fallen out. He was aware that good building blocks were made in Montreal, but what he wanted in particular was to regulate the use of what he called cinder blocks.

The motion submitted by Alderman Drummond read as follows

"That the executive committee be requested to inform the council at its next meeting as to what measure they have taken in connection with the suggestion made to them by the council on several occasions with regard to the regulation of cement blocks used in the construction of buildings."

Speaking on his motion, Alderman Drummond said he had been bringing the question of the regulation of building blocks before the council for two or three years. He mentioned the use of cinder blocks in buildings, which he opposed. Good cement blocks were made in Montreal, but there were also the poorly made blocks to compete against them in making sales. He had drawn attention to that matter before without much success. Referring to an accident whereby gas fumes penetrated the walls of a building, he said that if the inmates of that house had died he feared the city would have to accept some responsibility. He regretted the delay in dealing with the matter, adding that what was going on in Rosemount ward should be stopped.

The motion was declared adopted.

Straining for "Effect" in Block Making

THE concrete block manufacturer, having such a plastic material at his command, is often tempted to try for unusual effects. Of course it is in this way that progress has been made in the art, but sometimes the result of such attempts cannot be called a success.

A case in point is shown in the accompanying picture which was taken at the yard of a block-maker, a one-man affair, near Feura Bush, N. Y. Some of the blocks, which have been faced by scrubbing, so as to expose the aggregate, are very neat in appearance but those which have been faced with smooth, round pebbles look like a disorganized case of eggs.

A similar block has been used to some extent in a New Jersey town famous for its handsome residences, and the effect of the block in the wall is distinctly unhappy. It has nothing of the charm of ruble masonry, which it apparently tries to represent, nor has it the pleasing appearance of a well made concrete block in which the aggregate has been carefully chosen and exposed.

It is more and more coming to be understood that a concrete block is a concrete block—not an imitation of stone or anything else—and that as an architectural unit it has a beauty of its own that gives it a real place in construction, as much for its appearance as for its utilitarian qualities.

An unfortunate attempt to produce "something different"

Growth of Cement Products

THE Department of Commerce announces that, according to the data collected at the biennial census of manufactures, 1923, the establishments engaged primarily in the manufacture of artificial stone products (not including paving or roofing), such as building blocks, building trimmings, etc., and other articles manufactured from a combination of stone, gravel or sand, with cement, reported products valued at $53,602,321, an increase of 68.7% as compared with $31,768,143 in 1921, the last preceding census year.

The statistics for 1923 and 1921 are summarized in the following statement. The figures for 1923 are preliminary and subject to such correction as may be found necessary upon further examination of the returns.

The 1138 establishments reporting for 1923 were distributed throughout 43 states and the District of Columbia. The following statement shows, for 1923 and 1921, the number of establishments and the production in those states in which there were in 1923 three or more establishments and in which the total value of products amounted to $500,000 or more:

State	No. estab. 1923	No. estab. 1921	Value of products* 1923	Value of products* 1921
New York	91	104	6,001	3,562
Michigan	73	66	5,191	1,521
California	102	94	4,939	3,042
Indiana	65	68	3,933	1,881
Pennsylvania	78	65	3,616,	1,942
Illinois	81	88	3,369	1,768
Ohio	95	106	3,179	2,022
New Jersey	64	50	3,119	1,374
Oklahoma	5	5	2,448	137
Minnesota	69	84	2,412	3,006
Massachusetts	40	21	2,152	984
Wisconsin	63	50	1,974	1,147
Iowa	54	72	1,107	1,820
Nebraska	26	22	1,014	664
Connecticut	14	9	982	440
Florida	20	18	821	632
Washington	23	21	774	611
Texas	17	12	657	358
Maryland	16	11	639	193
West Virginia	16	16	639	823
Oregon	16	13	584	473
Kansas	15	17	530	250
Other States and Dist. of Columbia	95	111	3,412	3,118
Total	1,138	1,123	$53,492	$31,768

*Expressed in thousands.

	1923	1921	Per cent of Increase
Number of establishments	1,138	1,123	1.3
Wage earners (average number)*	10,766	6,984	54.2
Maximum month	Aug. 12,441	Sept. 7,761	.....
Minimum month	Jan. 7,968	Feb. 5,566	.....
Per cent of maximum	64.0	71.7	.....
Wages	$14,834,042	$ 8,690,770	72.3
Cost of materials (including fuel and containers)	20,485,547	13,483,392	51.9
Products, total value	53,602,321	31,768,143	68.7
Value added by manufacturer†	33,116,774	18,284,751	81.1
Horsepower	31,050	(‡)	.....
Coal consumed (tons of 2,000 lbs.)	46,872	(‡)	.....

*Not including salaried officers and employees nor proprietors and firm members. Statistics for these classes will be given in final report.
†Value of products less cost of materials.
‡Not reported.

Traffic and Transportation

By EDWIN BROOKER, Consulting Transportation and Traffic Expert
Munsey Building, Washington, D. C.

Proposed Changes in Rates

THE following are the latest proposed changes in freight rates up to the week beginning December 29:

Central Freight Association Docket

9793. Cement. C. F. A. territory to stations on Raquette Lake Ry. Present, arbitraries are provided for in N. Y. C. R. R. fast freight lines I. C. C. No. 2, over Carter, N. Y., of 11⅞ cents to Eagle Bay, N. Y., and 15½ cents to Raquette Lake, N. Y.; proposed, arbitraries over Carter, N. Y., 8 cents to Eagle Bay and 11 cents to Raquette Lake, N. Y.

9796. Sand and gravel. Columbus, Ohio, to Valley Crossing, Chillicothe and Portsmouth, Ohio. Present, 70 cents to Valley Crossing; 90 cents to Chillicothe, and $1.10 per net ton to Portsmouth, Ohio; proposed, 60 cents, 70 cents and 80 cents per net ton, such rates to apply as maxima.

9789. Sand and gravel. South Dayton, Ohio, to (a) Bridgetown, Ohio, (b) Hillsboro, Ohio. Present, 13½ cents to Bridgetown, Ohio, and 15 cents to Hillsboro; proposed, (a) 98 cents per net ton, (b) $1.10 per net ton.

9801. Crushed stone. France Quarries, Ohio, to Mariemont, Ohio. Present, 17 cents; proposed, $1.20 per net ton.

9812. Sand and gravel. Macksville and Terre Haute, Ind., to Rockville, Ind. Present, 75 cents per net ton; proposed, 65 cents per net ton.

9813. Crushed stone, coated with oil, tar or asphaltum. Shaw Junction, Penn., to Cumberland, Md., and Altoona, Penn. Present, 23½ cents; proposed, $2.26 per net ton.

9832. Gravel and sand, except blast, engine, foundry, glass, loam, marl, molding and silica. Richmond, Ind., to Collinsville, Ohio. Present, 76 cents per net ton; proposed, 60 cents per net ton.

9824. Crushed stone. Buffalo, N. Y., New Castle, Penn., and points taking same rates to Pennsylvania.

From Buffalo, N. Y., per net ton:

To	Present High	Low	Proposed
Adamsville, Penn.	$2.02	$1.85	$1.60
Albion, Penn.	1.51	1.40	1.25
Cranesville, Penn.	1.51	1.40	1.25
Fairview, Penn.	1.25	1.25	1.15
Hartstown, Penn.	2.02	1.85	1.60
Linesville, Penn.	1.76	1.76	1.60
North Girard, Penn.	1.25	1.25	1.15
Platea, Penn.	1.51	1.40	1.25
Pittsburgh, Penn.	2.65	2.05	2.20
Shermansville, Penn.	2.02	1.85	1.60
Swanville, Penn.	1.25	1.25	1.15
Shippenville, Penn.	2.27	2.05	1.75
Van, Penn.	1.89	1.89	1.75

From New Castle, Penn., and points now accorded same rates:

To	Present High	Low	Proposed
Corry, Penn.	$1.50	$1.40	$1.25
Erie, Penn.	1.25	1.05	1.15
Fairview, Penn.	1.05	1.05	1.15
Swanville, Penn.	1.05	1.05	1.15
Union City, Penn.	1.40	1.40	1.25

9844. Crushed stone and stone screenings. Chewton, Ellwood City, and Rock Point, Penn., to (a) stations on White's Creek branch of the B. & O. R. R., viz., Coughanour Mine, Dumas, Anspach, Beachley Mine, Listonburg, Unamis, Penn.; (b) stations on Confluence and Oakland branch of the B. & O. R. R., viz., Charleston, Flanigan, Tub Run, Somerfield and Watson, Penn., Geices, Buffalo Run, Selbysport, Friendsville, McCullough Mine and Kendall, Md. Present, sixth class; proposed, $1.70 per net ton.

9849. Sand and gravel. Urbana, Ohio, to Lorain, Ohio. Present, 18 cents; proposed, $1.10 per net ton.

9860. Sand and gravel. Blissfield, Ohio, to Cleveland, Ohio. Present, $1.20; proposed, 90 cents.

9862. Crushed stone and stone screenings. Chewton, Ellwood City, and Rock Point, Penn., to Venango, Penn. Present, 14 cents; proposed, $1.25 per net ton.

9863. Sand and gravel. Cleveland, Ohio, to Conneaut Harbor, Ohio. Present, 13½ cents; proposed, $1.10 per net ton.

9865. Sand and gravel. Urbana, Ohio, to Columbus, Ohio. Present, 60 cents; proposed, 70 cents per net ton.

9866. Sand and gravel. Merom and Riverton, Ind., to Missouri-Illinois R. R. stations, Salem, Ill., to Evansville, Ill. Present, Salem to Centralia, 16½ cents; Noltings to Nashville, 17 cents; Cordes to Evansville, Ill., 20½ cents; proposed, $1.26 per net ton.

9869. Crushed stone. Bellevue, Sandusky and Marblehead, Ohio, to Fort Wayne, Butler, Ind., and Bryan, Ohio.

From Bellevue, Ohio, to:

	Present	Proposed
Fort Wayne, Ind.	(*)	$1.04
Butler, Ind.	.....	.....
Bryan, Ohio	$1.10	1.04
From Sandusky, Ohio, to:		
Fort Wayne, Ind.	(*)	1.04
Butler, Ind.	1.38	1.04
Bryan, Ohio	.....	.....
From Marblehead, Ohio, to:		
Fort Wayne, Ind.	(*)	1.04
Butler, Ind.	.....	.....
Bryan, Ohio	1.10	1.04

*Class rate.

Southwestern Freight Bureau Docket

3266. Gravel. To establish the following rates on gravel, carloads, minimum weight 80,000 lb. per car, from Neal Springs, Ark. (rates in cents per 100 lb.):

To Texas.	Rates
Sulphur	5
Domino	5
Springdale	5½
Richeys	5½
Lanark	5½
Queen City	5½
Atlanta	5½
Galloway	5½
Bivins	5½
Wayne	5½
Bancker	6½
Kildare	6½
Lodi	6½
Stalls	6½
Jefferson	6½
Woodlawn	7
Andrews	7
Marshall	7
Scottsville	7
Jonesville	7
Waskom	7

It is stated that class rates will not permit movement, and shippers request publication of rates as outlined above.

Illinois Freight Association Docket

2936. Stone, sand and gravel. Carloads, from Joliet district to Lovington, Ill. Present, 12½ cents per 100 lb.; proposed, $1.13 per net ton. (Penn. R. R. only.)

Southern Freight Association Docket

17817. Cement. In lieu of present combination rates, it is proposed to establish joint through rates on cement, carloads, from Kingsport, Tenn., to branch line stations on N. & W. Ry., determined on same basis as used in constructing rates now effective to equidistant points; also to advance the present rate of 14½ cents to Portsmouth and Ironton, Ohio, via N. & W. Ry., to be the same as the rate via the C. & O. Ry., i. e., 17 cents per 100 lb.

17857. Crushed stone. Carloads, from High Bridge, Ky., to Mariemont, Ohio. Present, Cincinnati, Ohio, combination; proposed, $1.58 per net ton, arrived at by use of $1.13 per ton to Cincinnati, which is the mileage rate for the distance, plus a proportion of 45 cents per ton beyond Cincinnati.

17864. Stone, crushed, stone, rubble, stone screenings, slag, chert, sand and gravel (washed or unwashed). Carloads, from Holton and Stockbridge, Ga., to Georgia and Florida Ry. junction points. It is proposed to establish rates on basis of the proposed Georgia joint trunk line scale, less 10%, which represents reductions.

17868. Cement. Carloads, from Birmingham, Boyles and North Birmingham, Ala., to Emory and Wallace's Mill, Ga. Present, 10½ cents; proposed, 12½ cents per 100 lb., same as rate in effect from Ragland, Ala., to these points.

17877. Sand and gravel. Carloads, from Montgomery, Ala., to Jasper, Fla. Present, $30.50 per car of 30,000 lb., or $2.03.3 per ton; proposed, $1.71 per ton, based on the carrier proposed trunk line scale for application within the states of Alabama and Georgia, less 10%.

17889. Crushed stone, etc. Carloads, from Holton and Stockbridge, Ga., to Lake City, Fla. Present, from Holton $1.76, from Stockbridge $1.80 per net ton; proposed, from both points, $1.60 per net ton, made in line with present rate from Columbia, S. C., to Lake City, Fla.

17892. Gravel. It is proposed to cancel specific rates on gravel, carloads, from gravel pits in Mississippi on the Memphis Division of the Southern Ry., viz.: Gravel Siding, Morrison, and Oldham, Miss., to local stations on the Y. & M. V. R. R. in Mississippi. Lowest combination to apply after cancellation, which will result in reductions in nearly all cases.

17905. Cement. Carloads, from Southern producing points to stations on the Norfolk Southern Railroad, viz.: Russell, Va., to Hancock, N. C., inclusive; from Berkley, Va., to Edenton, N. C., inclusive. It is proposed to establish the following rates: From Birmingham district, Leeds and Ragland, Ala., 28 cents; from Chattanooga and Richard City, Tenn., 27 cents; from Rockmart, Ga., and Portland, Ga., 26 cents; from Spocari, Ala., 31 cents; from Kingsport, Tenn., 23 cents per 100 lb. The proposed rates are made the same as the rate carriers proposed to establish under the general revision to Norfolk, Va.

17910. Cement. It is proposed to revise existing rates on cement from Kingsport, Tenn., to points on the C. N. O. & T. P. Ry., Georgetown, Ky., and South to 17 cents per 100 lb., made same as rate recently authorized from Nashville, Tenn., to Junction City, Ky., with rates to points north of Georgetown to and including Devon, Ky., revised to basis of the joint line scale as proposed by Southern carriers in the general revision of cement rates.

17943. Sand. Carloads, from Montgomery, Ala., to Gantt's Quarry, Ala. Present, 11½ cents per 100 lb. (Class N); proposed, 79 cents per net ton, made in line with rates from and to other Alabama points of similar distance.

17961. Sand and gravel. Carloads, from Norris, Ga., to S. & A. Ry. stations, viz., Kildare, Ardmore, Shawnee, Lorenzo, Bethel, and Rahn, Ga. Lowest combination now applies. Proposed, $1.40 per net ton, based on proposed Georgia-Alabama Trunk Line scale (joint), less 10%, except to Lorenzo, Bethel, and Rahn, Ga., Port Wentworth, Ga., rate observed as maxima.

17962. Sand and gravel. Carloads, from Norris, Ga., to G. S. & F. Ry. stations, viz., Staunton, Lenox, and Osgood, Ga. Present, $1.91; proposed, $1.62 per net ton, based on the proposed Georgia-Alabama scale, less 10%.

17966. Sand, gravel and chert. It is proposed to establish rates on sand, gravel and chert, in bulk, straight, or sand and gravel mixed, in bulk. Carloads, minimum weight 90% of marked capacity of car, except when cars are loaded to their visible capacity actual weight will govern, between stations on the Central of Georgia Ry. in Alabama, Florida, Georgia and Tennessee, applicable on interstate traffic, on basis of the carrier's proposed Georgia scale.

New England Freight Association Docket

7599. Cement (common, hydraulic, natural portland and unburnt). Hudson and Hudson Upper, N. Y., to Palmertown, Conn., $3.40 per net ton. Reason: To place Hudson and Hudson Upper on basis comparable with Alsen, N. Y.

Trunk Line Association Docket

12383. To publish switching charge of 29 cents per 2000 lb. on cement, common, hydraulic, natural or portland. Carloads, originating at cement shipping stations on the Lehigh and New England Railroad and other lines in the Lehigh district, to apply in addition to the Annapolis, Md., rate on shipments consigned to the United States Naval Academy Grounds, Annapolis, Md. Reason for this proposal: in order to place charges on a proper basis. File 23648.

Western Trunk Line Docket

2692B. Stone, crushed. Carloads, from St. Louis, Mo., to Omaha, Neb. Present, 13½ cents per 100 lb.; proposed, 11 cents per 100 lb. Minimum weight 90% of marked capacity of car, but not less than 40,000 lb.

New York Brick Makers Fear Concrete Block and Tile Competition

AROUSED by the inroads made by the hollow tile and concrete block industries in their field, the common brick manufacturers held a meeting at the Hotel Biltmore recently. As a result of this conference 45 manufacturers favored the calling of another within the next two weeks to decide upon protective measures to be taken to combat the situation, according to the *Record and Guide.*

The brick situation in Greater New York today is quiescent. Although tows are coming down the Hudson River as fast as the dryer yards can ship them, in their attempt to beat the coming of real winter when the waters become ice, and although arrivals are being sold in corresponding alacrity the fact remains that there are today around New York City more than 40,000,000 brick awaiting discharge and distribution.

This condition has been gradually growing to a focus in the eyes of the manufacturers because they realize that their product is being supplanted in many instances on big projects by tile and concrete block.

The fear of foreign bricks is no longer extant among the Hudson river makers because of the low price level that has been reached in this commodity today. Quotations show common brick of the best grade at $14 alongside dock to dealers to $18 per thousand delivered at the job site in Manhattan, Bronx and Brooklyn. Inferior grades are quoted as low as $13 wholesale and $17 delivered.

Recent advices state that 9,000,000,000 brick were made in the United States this year against 60,000,000 foreign brick that entered this port. This was the greatest annual supply prepared for the building market of the nation in the history of the industry.—*Brooklyn (N. Y.) Eagle.*

Suffocated in Slide of Cement

BURIED under tons of cement at the plant of the Giant Portland Cement Co., Stephen Bauer, aged 40 years, of Hokendauque, met death by suffocation.

Bauer, who was at work in the Reliance plant of the company, was engaged in cleaning out a cement bin, when he lost his balance and was carried into the chute leading from the bottom of the bin. As Bauer went hurtling to the bottom the tons of cement became loosened from the sides of the holder. When fellow workmen rushed to his aid they were required to work some time before the body was found. A physician was immediately summoned, but Bauer was already dead. — *Allentown (Penn.) Chronicle.*

New Egyptian Cement Earnings in 1924

AN official statement issued by the New Egyptian Portland Cement Co., 408 West Fort street, Detroit, Mich., makes the following announcement:

"At a board of directors' meeting of the New Egyptian Portland Cement Co., held on December 30, 1924, a 4% dividend was declared to stock of record January 5, 1925.

"This is the second 4% dividend that has been declared during 1924.

"During 1924 the New Egyptian plants at Fenton and Port Huron produced and marketed 4,000,000 sacks of cement, and prospects for 1925 are considered very satisfactory indeed."

Cement Plant to Be Erected in Brazil

PREPARATIONS are being made for the construction of a large cement factory in the city of Rio Grande, State of Rio Grande do Sul, Brazil, Assistant Trade Commissioner Cremer, Rio de Janeiro, informs the Department of Commerce. The company building the plant will be capitalized at 10,000 contos (about $1,150,000), of which half is to be obtained by public subscriptions, and the remainder will be in the form of loans from the Government.—*U. S. Department of Commerce Reports.*

May Intervene in Cement Rate Case

THE Interstate Commerce Commission granted permission to the Trinity Portland Cement Co. of Dallas, Texas, to intervene in the case of the Texas Portland Cement Co. against the Arkansas Western Railway Co. in which rates on cement were attacked as unreasonable. The Trinity Portland Cement Co. will be treated as a party to the case with the right to appear and submit testimony.—*Boston Financial News.*

Work Begun on Springfield, Mo., Crushing Plant

ELECTION of officers of the recently-organized Stigall Construction company, which is erecting a large rock-crushing plant north of the city, was held recently. The state reports that samples of the stone from the quarry which are to be used have passed the highest of tests.

The company is capitalized at $50,000 and all the stockholders reside in Springfield.

The foundation for the plant is now being completed and the superstructure will go up as soon as possible, it was announced.—*Springfield (Mo.) Republican.*

New Gravel Plant to Be Built Near Tacoma, Wash.

PLANS for the State Gravel Co., with headquarters in Tacoma, to begin operation immediately near Stellacoom, Wash., were announced by W. R. Nichols, president of the organization, Tuesday. The company is incorporated for $100,000.

The gravel plant to be constructed will have all modern equipment, with a capacity of 1,000 yards of gravel a day. The plant will be electrically equipped throughout.

A road will be constructed to the site and work on the construction of the bunkers and other facilities will begin soon. It is expected the plant will go into operation about June 1.

Those interested in the new concern are: W. R. Nichols, president; F. T. Sherman of Seattle, vice president and general manager; Scott Z. Henderson, secretary; H. K. Nichols, treasurer, and D. C. Stapleton. Those named form the board of trustees, also.

Both Mr. Nichols, president of the company, and Mr. Sherman have been associated in business for 20 years in the state. The two men have built three large gravel plants on the Sound in the vicinity of their present concern.—*Tacoma (Wash.) News-Tribune.*

U. S. Gypsum Company History

A CHICAGO firm of security brokers, Roger and Tracy, Inc., is carrying the following advertisement in Chicago papers:

The Remarkable Earnings Record of the U. S. GYPSUM CO.

Net profits, before deductions, for the past 16 years are as follows:

1909	$ 437,783.00
1910	651,118.00
1911	566,836.00
1912	675,012.00
1913	778,812.00
1914	900,593.00
1915	811,419.00
1916	1,092,178.00
1917	1,288,673.00
1918	1,418,564.00
1919	1,853,730.00
1920	2,126,778.00*
1921	2,639,553.00
1922	4,370,771.00
1923	6,848,941.00
1924 (Est.)	8,500,000.00

*After deducting interest, depreciation, etc.

A Handsome Fire Brick Catalog

WHAT is possibly the most beautiful catalog ever issued for a product of the kind has been put out by the Societa Anonima G. Verzocchi, makers of fire brick in Milan, Italy. Many of its illustrations are perhaps too much of the "futurist" style to please American tastes, but combined with these are some of the most exquisite examples of color printing and etching and photo-engraving. The managing director in his introduction says it has been his purpose to tell the story of the industry in pictures without text and then to give examples of the principal shapes and sizes of the product of the works, and he has succeeded admirably in doing this.

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:			1.30 per net ton all sizes			
Buffalo, N. Y.			1.75	1.50	1.50	1.50
Chaumont, N. Y.	1.00		1.75	1.50	1.50	1.50
Columbia, Ill.	1.10	1.20	1.35	1.35	1.20	1.20
Eastern Pennsylvania	1.35	1.35	1.45	1.35	1.35	1.35
Munns, N. Y.	1.00	1.40	1.40	1.30	1.30	
Northern New Jersey			1.60			
Prospect, N. Y.	1.00	1.40	1.40	1.30	1.30	
Walford, Penn.		1.35		1.50	1.60	1.60
Western New York	.85	1.25	1.25	1.25	1.25	1.25
CENTRAL						
Alton, Ill.	1.50		1.50			
Bloomville, Middlepoint, Dunkirk, Bellevue, Waterville, No. Baltimore, Holland, Kenton, New Paris, Ohio: Monroe, Mich.; Huntington, Bluffton, Ind.	1.00	1.10	1.10	1.10	1.00	1.00
Buffalo, Iowa	1.10		1.25	1.05	1.10	1.10
Chicago, Ill.	.80	1.00	1.00	1.00	1.00	1.00
Dundas, Ont.	.75	1.00	1.00	.90	.90	.90
Greencastle, Ind.	1.25	1.25	1.15	1.05	1.05	1.05
Lannon, Wis.	.80	1.10	1.10	.90	.90	.90
Linwood, Iowa	1.00	1.25	1.25	1.05	1.05	1.15
Northern New Jersey	1.30		1.80	1.60	1.40	
St. Vincent de Paul, P. Q.	.90	1.25@1.45	1.00	.90	.90	
Stone City, Iowa	.75		1.20†	1.10	1.05	
Waukesha, Wis.	1.10	1.10	1.10	1.10	1.10	1.10
Wisconsin Points	.50@1.50		1.10	1.00	1.00	
Youngstown, Ohio				1.50	1.60	1.60
SOUTHERN:						
Alderson, W. Va.	.60	1.60	1.60	1.50	1.40	
Bridgeport and Chico, Texas	100a	1.35b	1.35b	1.25	1.20	1.15
Cartersville, Ga.	1.65	1.65	1.65	1.35	1.35	
El Paso, Texas	1.00	1.00	1.00	1.00		
Ft. Springs, W. Va.	.60	1.60	1.60	1.50	1.40	
WESTERN:						
Atchison, Kans.	.50	2.00	2.00	2.00	2.00	1.60‖@1.80
Blue Spr'gs & Wymore, Neb.	.20	1.45	1.45	1.35@1.40	1.25@1.30	1.20
Cape Girardeau, Mo.	1.25		1.25	1.25	1.00	
Kansas City, Mo.	1.00	1.65	1.65	1.65	1.65	1.65

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.60	1.60	1.35	1.15	1.00	
Cypress, Ill.	1.00@1.10					
Duluth, Minn.	1.00	2.25	1.75	1.50	1.30	1.30
Dwight, Calif.	1.75	1.75	1.75	1.75	1.75	
Eastern Maryland	1.10	1.75	1.70	1.60	1.50	1.50
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.75	1.70	1.60	1.50	1.50
Minneapolis, Minn.	1.25		2.25	2.00	1.75	
Northern New Jersey	1.70	2.20	2.00	1.60	1.60	
Oakland, Calif.	1.75	1.75	1.75	1.75	1.75	
San Diego, Calif.	.50@.75	1.80@1.90	1.60@1.80	1.35@1.55	1.35@1.55	1.25@1.45
Springfield, N. J.	2.00	2.10	2.10	1.70	1.60	1.60
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	1.10

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley and Red Granite, Wis.	1.60	1.70	1.60	1.50	1.40	
Eastern Penn.—Sandstone	1.25	1.65	1.60	1.40	1.40	1.25
Eastern Penn.—Quartzite	1.20	1.35	1.20	1.20	1.20	1.20
Graysville, Ga.—Granite	1.00		1.00	.90		
Lithonia, Ga.—Granite	.75(c)	2.00	1.75	1.25	1.25	
Lohrville, Wis.	1.65	1.65@1.70	1.65	1.45	1.50	
Middlebrook, Mo.—Granite	3.00@3.50		2.00@2.25	2.00@2.25	2.00@2.25	1.25@2.00
Northern New Jersey (Basalt)	150	2.00	1.80	1.40	1.40	
Richmond, Calif. (Basalt)	.75*		1.50*	1.50*	1.50*	

*Cubic yd. †1 in. and less. ‖Rip rap per ton; (a) dust in; (b) dust out; (c) sand.

Agricultural Limestone

(Pulverized)

Alton, Ill. — Analysis, 98% $CaCO_3$; 90% thru 100 mesh 6.00

Asheville, N. C. — Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200-lb. burlap bag, 4.00; bulk 2.75

Branchton, Penn. — 100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers) 5.00

Bridgeport and Chico, Texas—100% thru 100 mesh, bags 10.00

Cartersville, Ga. — Analysis, 56% $CaCO_3$, 42% $MgCO_3$; pulverized 2.25
50% thru 50 mesh 1.50

Chaumont, N. Y. — Pulverized limestone, bags, 4.00; bulk 2.50

Colton, Calif.—Analysis, 95% $CaCO_3$, 3% $MgCO_3$—all thru 20 mesh—bulk 4.00

Dundas, Ont., Can.—Analysis, 53.80% $CaCO_3$, 43.31% $MgCO_3$; 35% thru 100 mesh, 50% thru 50 mesh, 100% thru 10 mesh; bags, 4.75; bulk 3.00

Hillsville, Penn. — Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$, 75% thru 100 mesh; sacks, $5.00; bulk 3.50

Jamesville, N. Y.—Analysis, 89.25% $CaCO_3$; 5.25% $MgCO_3$; pulverized, bags, 4.00; bulk 2.50

Knoxville, Tenn.—80% thru 100 mesh, bags, 3.95; bulk 2.70

Linville Falls, N. C.—Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200-lb. burlap bag, 4.00; bulk 2.75

Marblehead, Ohio — Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 70% thru 50 mesh; 100% thru 10 mesh; 80 lb. paper sacks, 5.00; bulk 3.50

Marion, Va. — Analysis, 90% $CaCO_3$, 2% $MgCO_3$; 42.5% thru 100 mesh, 11.3% thru 80, 20.2% thru 60, 22.8% thru 40, 3.2% thru 20 and under or 75% thru 40 mesh; pulverized, per ton 2.00

Mayville Wis.—59.8% thru 60 mesh .. 2.35

Mountville, Va.—Analysis 76.60% $CaCO_3$, 22.83% $MgCO_3$; 50% thru 100 mesh, 100% thru 20 mesh—125-lb. hemp bags 5.00

Osborne, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers) 5.00

Piqua, Ohio—Total neutralizing power 95.3%; 100% thru 10, 60% thru 50; 50% thru 100 ..... 2.10@ 2.25
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.00; bulk 3.50
100% thru 100, 85% thru 200; bags, 7.00; bulk 5.50

Rockdale, Mass. — Analysis, 90% $CaCO_3$—50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk 3.25

West Stockbridge, Mass. — Analysis, 90% $CaCO_3$—50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk 3.25

Agricultural Limestone

(Crushed)

Alderson, W. Va. — Analysis, 90% $CaCO_3$; 50% thru 100 mesh 1.50

Alton, Ill.—Analysis 98% $CACO_3$; 50% thru 4 mesh 3.50

Bedford, Ind.—Analysis, 98½% $CACO_3$, ½% $MgCO_3$; 90% thru 10 mesh 1.50

Bettendorf, Iowa — 97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh 1.50

Blackwater, Mo.—98% $CaCO_3$; 100% thru 8 mesh 1.00

Bridgeport and Chico, Texas — 50% thru 50 mesh; 90% thru 4 mesh 1.50
50% thru 4 mesh 1.25

Cape Girardeau, Mo.—Analysis, 93.5% $CaCO_3$, 3.5% $MgCO_3$; 50% thru 100 mesh 1.50

(Continued on next page)

Agricultural Limestone

(Continued from preceding page)

Chicago, Ill.—50% thru 100 mesh; 90% thru 4 mesh ..... .80
Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$; 90% thru 50 mesh 1.50
Kansas City, Mo.—50% thru 100 mesh 1.25
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% through 10 mesh; 46% through 60 mesh 2.00
Screenings (¼ in. to dust) 1.00
Marblehead, Ohio.—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 100% thru 4 mesh; 85% thru 10 mesh; 53% thru 50 mesh; 40% thru 100 mesh bulk 2.60
32% thru 100 mesh; 51% thru 50 mesh; 83% thru 10 mesh; 100% thru 4 mesh (meal) bulk 2.25
Middlepoint, Bellevue, Kenton, Ohio; Monroe, Mich.; Huntington and Bluffton, Ind.—Analysis, 52% $CaCO_3$, 44% $MgCO_3$; meal, 100% thru 4 mesh, 35% thru 100 mesh .... .75@ 1.50
Milltown, Ind.—Analysis, 94.41% $CACO_3$, 2.95% $MgCO_3$; 30.8% thru 100 mesh .38% thru 50 mesh .... 1.45@ 1.60
Moline, Ill.—97% $CaCO_3$, 2% $MgCO_3$ —50% thru 100 mesh; 50% thru 4 mesh 1.50
Pixley, Mo.—Analysis, 96% $CACO_3$; 50% thru 50 mesh 1.25
50% thru 100 mesh; 90% thru 50 mesh; 50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh 1.65
River Rouge, Mich.—Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk ..... .80@ 1.40
Stone City, Iowa.—Analysis, 98% $CaCO_3$; 50% thru 50 mesh ..... .75

Pulverized Limestone for Coal Operators

Hillsville, Penn., sacks, 4.50; bulk 3.00

Miscellaneous Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton.

Glass Sand:

Berkeley Springs, W. Va. ..... 2.25@ 2.50
Cedarville and S. Vineland, N. J.—
Damp 1.75
Dry 2.25
Cheshire, Mass:
6.00 to 7.00 per ton; bbl. 2.50
Columbus, Ohio ..... 1.25@ 1.50
Estill Springs and Sewanee, Tenn. 1.50
Grays Summit and Klondike, Mo. 2.00
Mapleton Depot, Penn. ..... 2.00@ 2.25
Massillon, Ohio 3.00
Ohlton, Ohio 2.50
Oceanside, Calif. ..... 3.00@ 3.40
Pacific, Mo. ..... 2.25@ 3.00
Pittsburgh, Penn.—Dry 4.00
Damp 3.00
Red Wing, Minn.:
Bank run 1.50
Ridgway, Penn. 2.50
Rockwood, Mich. ..... 2.75@ 3.25
Round Top, Md. 2.25
San Francisco, Calif. ..... 3.00@ 3.50
St. Louis, Mo. ..... 1.50@ 3.00
Thayers, Penn. 2.50
Utica, Ill. ..... 1.00@ 1.25
Zanesville, Ohio 2.50

Miscellaneous Sands:

Aetna, Ind.:
Core, Box cars, net, .35; open-top cars ..... .30
Albany, N. Y.:
Molding fine, brass molding 3.00
Molding coarse 2.75
Sand blast 4.50
Arenzville, Ill.:
Core 1.00
Molding fine ..... 1.50@ 1.75
Brass molding 2.00
Beach City, Ohio:
Fine core, washed and screened 1.50
Furnace bottom; steel molding (fine and coarse) washed and screened 2.00
Traction 1.75
Cheshire, Mass.—Furnace lining, molding fine and coarse 5.00
Sand blast ..... 5.00@ 8.00
Stone sawing 6.00

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, f. o. b. producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Ambridge & So. H'g'ts, Penn.	1.25	1.25	1.15	.85	.85	.85
Buffalo, N. Y.	1.10	.95			.85	
Erie, Penn.		1.00		1.25	1.50	
Farmingdale, N. J.	.58	.48	.85		1.10	
Leeds Jct., Maine		.50	1.75		1.35	1.25
Montoursville, Penn.	1.00	1.10	1.00	1.00	1.00	.90
Northern New Jersey	.40@ .50	.40@ .50		1.25	1.25	1.25
Pittsburgh, Penn., and vicinity		1.25	1.25	.85	.85	.85
Shining Point, Penn.			1.00	1.00	1.00	1.00
Washington, D. C.—Rewashed, river	.85	.85	1.70	1.50	1.30	1.30
CENTRAL:						
Attica, Ind.	.75	.75	.75	.75	.75	.75
Barton, Wis.		.22@ .40	.20@ .40	.20@ .40	.32@ .40	
Columbus, Ohio	.75	.75@1.00	.75@1.00	.75@1.00	.75@1.00	.75
Covington, Ind.	.75	.75	.75	.75	.75	.75
Des Moines, Iowa	.50	.30	1.50	1.50	1.50	1.50
Eau Claire, Wis.	.60@1.00	.40@ .50	.85@1.25			.85@ .95
Elkhart Lake, Wis.	.60	.50	.60	.60	.60	.60
Ft. Dodge, Iowa	1.00		2.05	2.05	2.05	
Ft. Worth, Texas	2.00	2.00	2.00	2.00	2.00	2.00
Grand Rapids, Mich.		.50		.80	.70	.70
Hamilton, Ohio		1.00			1.00	
Hersey, Mich.		.50				.70
Indianapolis, Ind.	.60	.60		.90	.75@1.00	.75@1.00
Janesville, Wis.		.65@ .75			.65@ .75	
Mason City, Iowa	.45@ .55	.45@ .55	1.35@1.45	1.45@1.55	1.40@1.50	1.35@1.45
Mankato, Minn.		.50	1.25		1.25	
Milwaukee, Wis.	1.01	1.01	1.21	1.21	1.21	1.21
Minneapolis, Minn.*	.65	2.50†	2.00§		2.00	1.75
Northern New Jersey	.45@ .50	.45@ .50		1.25	1.25	
Palestine, Ill.	.75	.75	.75	.75	.75	.75
St. Louis, Mo., f. o. b. cars	1.18	1.45	1.65§	1.45		1.45§
Silverwood, Ind.	.75	.75	.75	.75	.75	.75
Summit Grove, Ind.	.75	.75	.75	.75	.75	.75
Terre Haute, Ind.	.75	.60	.90	.90	.90	.85
Wolcottville, Ind.	.75	.75	.75	.75	.75	.75
Waukesha, Wis.	.55	.55	.75	.75	.75	.75
Winona, Minn.	.40	.40	1.25	1.10	1.00	1.00
Yorkville, Sheridan, Oregon, Moronts, Ill.			Average .40@.60			
Zanesville, Ohio		.60	.60	.60	.90	
SOUTHERN:						
Brookhaven, Miss., Roseland La.	1.75*	.70	2.25	1.50	1.25	
Charleston, W. Va.	all sand 1.37 f.o.b. cars		all gravel 1.47 f.o.b. cars			
Chehaw, Ala.	1.24	1.24		1.90	1.90	1.90
Estill Sp'gs & Sewanee, Tenn.	1.00	.90	1.00	1.00		.85
Knoxville, Tenn.	1.00	1.20	1.20	1.20	1.20	1.20
Macon, Ga.	.50	.50		.55	.60	
New Martinsville, W. Va.	1.00	.90		1.30		.90
Smithville, Texas	1.00	1.00	1.00	1.00	1.00	1.00
WESTERN:						
Baldwin Park, Calif.		.25@ .35			.50@ .75	
Crushed rock	.90@1.10	.60@ .90	.60@ .90	.60@ .90	.60@ .90	
Kansas City, Mo.	Kaw river sand .75 per ton f.o.b. plants					
Los Angeles, Calif.		.40	.50	.65	.60	.60
Pueblo, Colo.	1.10	.90*		1.50*		1.65*
San Diego, Calif.	.50	.50	1.20	1.20	1.00	1.00
Seattle, Wash. (bunkers)	1.50*	1.50*	1.50*		1.50*	1.50*

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Boonville, N. Y.	.60@ .80		.55@ .75			1.00
Brookhaven, Miss., Rosel'd, La.	Road gravel, ballast gravel .60 a ton					
Chehaw, Ala.	.90@1.00					
Des Moines, Iowa	Washed, .50; unwashed, .40 (not screened)					
Dudley, Ky.‡	1.05	1.05		.95		
East Hartford, Conn.	Sand, .65 per cu. yd.					
Elkhart Lake, Wis.	.50					
Gainesville, Texas		.95				.55
Grand Rapids, Mich.				.55		
Hamilton, Ohio					.70	
Hersey, Mich.				.55		
Indianapolis, Ind.	Mixed gravel for concrete work, .65					
Lindsay, Texas						.55
Macon, Ga.	.35					
Mankato, Minn.	Pit run gravel, .60					
Moline, Ill. (b)	.60	.60	Concrete gravel, 50% G., 50% S., 1.00			
Montezuma, Ind.						.60
St. Louis, Mo.	Mine run gravel 1.55 per ton					
Shining Point, Penn.	Concrete sand, 1.10 ton					
Smithville, Texas	.50	.50	.50	.50	.50	.50
Summit Grove, Ind.	.50	.50	.50	.50	.50	.50
Waukesha, Wis.	.60	.60	.60	.60	.60	.60
Winona, Minn.				.60	.60	.60
York, Penn.	1.10	1.00				
Zanesville, Ohio		.60				

*Cubic yd.; †roofing gravel; §⅝ in. and less; ‡crushed silica; ‖2½ in. and less; (a) ¾ in. and less; (b) river run.

Miscellaneous Sands

(Continued from preceding page)

Columbus, Ohio:		
Core	.30@	.50
Furnace lining, molding coarse	2.00@	2.25
Molding fine	2.50@	2.75
Sand blast	4.00@	4.50
Stone sawing		1.50
Traction	.50@	.75
Brass molding	2.50@	3.00
Dresden, Ohio:		
Core	1.25@	1.50
Molding fine	1.50@	1.75
Molding coarse		1.50
Traction		1.25
Brass molding		1.75
Dunbar, Penn.:		
Traction (damp)		2.00
Eau Claire, Wis.:		
Sand blast	3.00@	3.25
Elco, Ill.:		
Ground silica per ton in carloads	20.00@	31.00
Estill Springs and Sewanee, Tenn:		
Molding fine and coarse, brass molding		1.25
Roofing sand, sand blast, traction		1.50
Franklin, Penn.:		
Core		2.00
Molding coarse and fine		1.75
Grays Summit, Mo.:		
Molding fine	1.75@	2.00
Joliet, Ill.:		
No. 2 molding sand; also loam for luting purposes and open-hearth work	.65@	.85
Klondike, Mo.:		
Molding fine	1.75@	2.00
Mapleton Depot, Penn.:		
Molding fine and coarse		2.00
Massillon, Ohio:		
Molding fine, coarse, furnace lining core and traction		2.50
Montoursville, Penn.:		
Core	1.25@	1.35
Traction	1.00@	1.10
Brass molding		1.50
New Lexington, Ohio:		
Molding fine		2.75
Molding coarse		2.25
Ohlton, Ohio:		
Core, furnace lining, molding fine and coarse, all green	1.75@	1.90
Roofing sand, sand blast, stone sawing, traction, all green		1.75
Add 50c a ton for green sand dried.		
Oceanside, Calif.:		
Roofing sand (stucco)	3.00@	3.40
Ottawa, Ill.:		
Crude silica sand	.75@	.85
Core, bags, 2.50; bulk		1.75
Sand blast		5.00
Stone sawing		1.75
Pacific, Mo.:		
Core, furnace lining	1.00@	1.25
Molding fine	.90@	1.00
Stone sawing	1.00@	1.75
Molding coarse	.85@	1.00
Red Wing, Minn.:		
Core, furnace lining, stone sawing		1.50
Molding fine and coarse, traction		1.25
Sand blast		3.50
Filter sand		3.75
Ridgway, Penn.:		
Core		2.00
Furnace lining, molding fine, molding coarse		1.25
Traction		2.25
Round Top, Md.:		
Core		1.60
Traction		1.75
Roofing sand		2.25
St. Louis, Mo.:		
Core	1.00@	1.75
Furnace lining		1.50
Molding fine	1.50@	2.50
Molding coarse	1.25@	1.75
Roofing sand		1.75
Sand blast	3.50@	4.50
Stone sawing	1.25@	2.25
Traction		1.25

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in. and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
E. Canaan, Conn.	3.00	1.00	2.25	1.25	1.25	1.15	1.15
Eastern Penn. and Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Reading, Pa.	2.50	1.00	2.50*	1.25			
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	2.05	1.45		1.45		1.45	
Jackson, Ohio		1.05		1.30	1.05	1.30	
Youngstown, Dover, Hubbard, Leetonia, Struthers, O.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.		1.55		1.55	1.55	1.55	
Ensley and Alabama City, Ala.	2.05	.80	1.25	1.15	.90	.90	.80
Longdale, Goshen, Glen Wilton, Roanoke, Ruesens, Va.	2.50	1.00	1.25	1.25	1.25	1.15	1.15

*Clean.

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Berkeley, R. I.			12.00					2.20
Buffalo, N. Y.				12.00				
Lime Ridge, Penn.							5.00a	
Williamsport, Penn.			10.00				6.00	
York, Penn.		10.50	10.50	11.50			8.50	1.65i
CENTRAL:								
Cold Springs, Ohio		9.00	9.00		9.00	11.00		
Delaware, Ohio	12.50	9.00	8.50	10.00			9.00	1.50
Gibsonburg, Ohio	12.50				9.00	11.00		
Huntington, Ind.	12.50	9.50	9.50		9.00		8.50	1.50c
Luckey, Ohio (f)	12.50							
Marblehead, Ohio		9.50	9.50				8.50	1.50c
Marion, Ohio		9.50	9.50				8.50	1.70j
Mitchell, Ind.		12.00	12.00	12.00	11.00		10.00	1.70e
Tiffin, Ohio					9.00			
White Rock, Ohio	12.50				9.00	11.00		
Woodville, Ohio	12.50†	9.00†	8.50†		9.00	10.50	8.00	1.60
SOUTHERN:								
Erin, Tenn.							8.50	1.40*
El Paso, Texas							9.00	
Graystone & Wilmay, Ala.	12.50	11.00		11.00			8.50	1.50
Karo, Va.		10.50	9.00				7.00g	1.65h
Knoxville, Tenn.	12.50	11.00		11.00		1.35	8.50	1.50
Varnons, Ala. (f)	11.00	11.00			9.50		8.50	15.00
Zuber an d Ocala, Fla.	14.00	12.00	10.00	14.00			12.00	1.70
WESTERN:								
Kirtland, N. M.							15.00	
San Francisco, Calif.	22.00	22.00	15.00	22.00			2.00n	2.50o
Tehachapi, Calif.							13.00	2.00d

*And 1.50; †50-lb. paper bags; (a) run of kilns; (c) wooden, steel 1.70; (d) wood; (e) wood bbl., $2.20 drum in steel; (f) dealers' prices; (g) to 9.50; (h) to 1.75; (i) 200 lb. bbl.; 2.65, 300 lb. bbl.; (j) steel; (l) bags; (m) finishing lime, 2.50 common; (n) common lime; (o) high calcium.

Miscellaneous Sands

(Continued)

Brass molding	2.00@	3.00
San Francisco, Calif.:		
(Washed and dried)—Core, molding fine, roofing sand and brass molding	3.00@	3.50
San Francisco, Calif. (Direct from Pit)		
Furnace lining, molding coarse, sand blast		3.60
Stone sawing, traction		2.30
Tamalco, Ill.:		
Molding coarse		1.50
Brass molding		2.00
Tamms, Ill.:		
Ground silica per ton in carloads	20.00@	31.00
Thayers, Penn.:		
Core		2.00
Molding fine and coarse		1.25
Traction		2.25
Utica, Ill.:		
Core, furnace lining, molding fine and coarse (crude and dried)	.60@	1.25
Roofing sand, stone sawing, brass molding	1.00@	1.25
Sand blast		2.25
Traction		1.00
Utica, Penn.:		
Core, molding fine, brass molding		2.00
Molding coarse	1.50@	1.75
Warwick, Ohio.:		
Core, molding coarse (green) 1.75; (dry) 2.50; traction		2.50
Zanesville, Ohio:		
Sand blast, core, traction		2.50
Furnace lining		2.25
Molding fine and coarse; brass molding	1.50@	1.75

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Baltimore, Md.:		
Crude talc (mine run)	3.00@	4.00
Ground talc (20-50 mesh), bags		10.00
Cubes		55.00
Blanks (per lb.)		.08
Pencils and steel workers' crayons, per gross		1.25
Chatsworth, Ga.:		
Crude (for grinding)		6.00
Ground (150-200 mesh) 200 lb. bags		10.00
Pencils and steel workers crayons	1.25@	2.00
Chester, Vt.:		
Ground (20-70 mesh)	7.00@	8.00
Ground (150-200 mesh)	8.00@	10.00
(Bags extra, returnable)		
E. Granville, Rochester, Johnson, Waterbury, Vt.:		
Ground talc (20-50 mesh) bags	7.00@	10.00
Ground talc (150-200 mesh) bags	10.00@	25.00
Pencils and steel workers' crayons, per gross	.75@	2.00
Emeryville, N. Y.:		
(Double air floated) including bags; 325 mesh (50 lb. paper, 100 & 200 lb. burlap bags)		14.75
Hailesboro, N. Y.:		
Ground (150-200 mesh) bags		18.00
Henry, Va.:		
Crude talc (mine run) per 2000-lb. ton	2.75@	3.50
Ground (150-200 mesh), bags	9.50@	15.00
Joliet, Ill.		
Ground (200 mesh), bags		30.00
Keeler, Calif.:		
(150-200 mesh); carloads, 30 tons or more (bags extra)	20.00@	30.00
Marshall, N. C.:		
Crude	4.00@	8.00
Ground (20-50 mesh), bags extra	6.50@	8.50
Ground (150-200 mesh), bags	8.00@	12.00
Natural Bridge, N. Y.:		
Ground talc (300-325 mesh), 200-lb. bags		13.50
50-lb. bags		14.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Gordonsburg, Tenn.—B.P.L. 68-72%	4.00@	4.50
Mt. Pleasant, Tenn.—B.P.L. 72%	5.50@	6.00
13% phosphoric acid, 95% thru 100 mesh	5.50@	6.00
75% hand mined	6.50@	6.75
75% (free of fines for furnace use)		6.75
75% max. 5½% I and A	6.50@	7.00
78% max. 4½% I and A	6.50@	8.00
75/78 B.P.L.		8.50
Tennessee—F. O. B. mines, gross ton, unground Tenn. brown rock, 72% min. B.P.L.		5.50
Twomey, Tenn.—B.P.L. 65%, 2000 lb.	7.00@	8.00

Ground Rock

(2000 lb.)

Centerville, Tenn.—B.P.L. 65%		7.00
Gordonsburg, Tenn.—B.P.L. 68-72%	4.50@	5.00
Mt. Pleasant, Tenn. — B.P.L. 65% 95% thru 100 mesh	6.50@	7.00
Twomey, Tenn.—B.P.L. 65%	7.00@	8.00

(Continued on next page)

Roofing Slate

The following prices are per square (100 sq. ft.) for Pennsylvania Blue-Clay Roofing Slate, f. o. b. cars quarries:

Sizes	Genuine Bangor, Washington Big Bed, Franklin Big Bed	Genuine Albion	Slatington Small Bed	Genuine Bangor Ribbon
24x12, 24x14	10.20	10.00	8.10	7.80
22x12	10.80	10.00	8.40	8.75
22x11	10.80	10.50	8.40	8.75
20x12	12.60	10.50	8.70	8.75
20x10, 18x10, 18x9, 18x12	12.60	11.00	8.70	8.75
16x10, 16x9, 16x8, 16x12	12.60	11.00	8.40	8.75
14x10	11.10	11.00	8.10	7.80
14x8	11.10	10.50	8.10	7.80
14x7 to 12x6	9.30	10.50	7.50	7.80
	Mediums	Mediums	Mediums	Mediums
24x12	$ 8.10	$8.10	$7.20	$5.75
22x11	8.40	8.40	7.50	5.75
Other sizes	8.70	8.70	7.80	5.75

For less than carload lots of 20 squares or under, 10% additional charge will be made.

(Continued from preceding page)

Florida Soft Phosphate

(Raw Land Pebble)

Per Ton

Florida—F. O. B. mines, gross ton, 68/66% B.P.L., Basis 68%	2.25
70% min. B.P.L., Basis 70%	2.50
72% min. B.P.L., Basis 72%	2.75
75/74% B.P.L., Basis 75%	3.75

Fluorspar

Fluorspar—80% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines	17.50
Fluorspar—85% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines	18.00
Fluorspar, foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Philadelphia, duty paid, per gross ton	19.75

Special Aggregates

Prices are per ton f. o. b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco chips
Barton, Wis., f.o.b. cars		10.50
Chicago, Ill.—Stucco chips, in sacks f.o.b. quarries		17.50
Crown Point, N. Y.—Mica Spar		7.00@ 8.00
Easton, Penn.—Evergreen, grit (bulk)		2.00
Royal grit (bulk)		3.00
Haddam, Conn.—Felstone buff	12.00	12.00
Harrisonburg, Va.—Blk marble (crushed, in bags	12.50	12.50
Ingomar, Ohio (in bags)		6.00@20.00
Middlebrook, Mo.—Red		20.00@25.00
Milwaukee, Wis.		14.00@34.00
Newark, N. J.—Roofing granules		7.50
New York, N. Y.—Red and yellow Verona		32.00
Poultney, Vt., 2000 lb.		6.12
Red Granite, Wis.		7.50
Sioux Falls, S. D.	7.50	7.50
Stockton, Cal.—Sized rock for roofing and stucco dashes, CL lots		12.00
Tuckahoe, N. Y.—2000 lb.		8.00@12.00
Wauwatosa, Wis.		16.00@45.00
Whitestone, Ga.—White marble chips, net ton in bulk, f.o.b. cars, granite	4.50@ 6.00	4.50@ 6.00

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	22.00	
Baltimore, Md. (Del. according to quantity)	16.00@17.00	22.00@50.00
Ensley, Ala. ("Slagtex")	12.50	22.50@33.50
Eugene, Ore.	25.00	35.00@75.00
Friesland, Wis.	22.00	32.00
Milwaukee, Wis.	14.00@15.00	33.00@75.00
Omaha, Neb.	18.00	30.00@40.00
Philadelphia, Penn.	15.00	21.00
Portland, Ore.	19.00	25.00@75.00
Prairie du Chien, Wis.	14.00	22.00@30.00
Puyallup, Wash.	20.00	30.00@90.00
Rapid City, S. D.	18.00	25.00@45.00
Wauwatosa, Wis.	14.00@18.00	30.00@42.00

Sand-Lime Brick

Prices given per 1000 brick f. o. b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis.	10.00
Boston, Mass.	14.00@15.50
Dayton, Ohio	12.50@13.50
Grand Rapids, Mich. (wholesale)	10.00
Jackson, Mich.	13.00
Lancaster, N. Y.	13.00
Michigan City, Ind.	11.00
Milwaukee, Wis.	13.00
Plant City, Fla.	12.00@16.00
Portage, Wis.	15.00
Rochester, N. Y. (delivered)	19.75
Saginaw, Mich.	13.00
San Antonio, Texas	12.50@14.00
Syracuse, N. Y.	18.00

Gray Klinker Brick

El Paso, Texas	13.00

Lime

Warehouse prices, carload lots at principal cities.

	Hydrated, Finishing	per ton Common
Atlanta, Ga.	22.50	14.00
Baltimore Md.	24.25	17.85
Boston, Mass.	20.50	15.50
Cincinnati, Ohio	16.80	14.30
Chicago, Ill.	20.00	18.00
Dallas, Tex.	20.00	
Denver, Colo.	24.00	
Detroit, Mich.	22.00	20.00
Minneapolis, Minn. (white)	25.50	21.00
Montreal, Que.		21.00
New York, N. Y.	18.20	13.10
Philadelphia, Penn.	23.00	16.00
St. Louis, Mo.	24.00	20.00
San Francisco, Calif.	22.60	
Seattle, Wash. (paper sacks)	24.00	

Portland Cement

Prices per bag and per bbl. without bags net in carload lots.

	Per Bag	Per Bbl.
Albany, N. Y.		2.62
Atlanta, Ga.		2.35
Boston, Mass.		2.53@3.03†
Buffalo, N. Y.		2.38@2.88†
Cedar Rapids, Iowa		2.38
Cincinnati, Ohio		2.37
Cleveland, Ohio		2.39
Chicago, Ill.		2.10
Columbus Ohio		2.44
Dallas, Texas	.53¾	2.15
Davenport, Iowa		2.29
Dayton, Ohio		2.48
Denver, Colo.	.63¾	2.55
Detroit, Mich.		2.40
Duluth, Minn.		2.19
Indianapolis, Ind.		2.31
Kansas City, Mo.		1.97
Los Angeles, Cal. (less 5c dis.)	.65	2.60
Memphis, Tenn.		2.60
Milwaukee, Wis.		2.25
Minneapolis, Minn.		2.42
Montreal, Canada (sks. 20c ext.)		1.90a
New Orleans, La.		2.40
New York, N. Y.		2.15@2.65†
Peoria, Ill.		2.27
Philadelphia, Penn.		2.41@2.81†
Phoenix, Ariz.	.82½	3.65
Pittsburgh, Penn.		2.19
Portland, Ore.		3.05
San Francisco, Cal.	.65¼	2.61*
St. Louis, Mo.	.57½	2.30
St. Paul, Minn.		2.42
Seattle, Wash. (10c bbl. dis.)		2.65
Toledo, Ohio		2.36

NOTE—Add 40c per bbl. for bags.
*5¢ cash disc 10 days.
†Prices to contractors, including bags.
(a) Less 10c 20 days.

Mill prices f.o.b. in carload lots, without bags, to contractors.

	Per Bag	Per Bbl.
Buffington, Ind.		1.95
Concrete, Wash.		2.60
Dallas, Texas		2.15
Fordwick, Va.		2.05
Hannibal, Mo.		2.05
Hudson, N. Y.		2.05
Kingsport, Tenn.		2.05
Leeds, Ala.		1.95
Louisville, Ky.		2.45
Northampton, Penn.		1.95
Steelton, Minn.		2.00
Universal, Penn.		1.95

Cement Products

Hawthorne tile, carload lots, f. o. b. plant.

	Cicero, Ill. Per sq.	Ft. Worth, Tex. Per sq.
Silver gray		8.00
Red French	9.00	9.00
Green French	11.00	10.00
Red Spanish	12.00	9.00
Green Spanish	14.00	10.00

	—Cicero— Red	Green	—Ft. Worth— Gray	Red	Green
Ridges	.25	.35	.25	.25	.30
Hips	.20	.30	.14	.14	.17
Ridge closers	.05	.06	.06	.06	.06
Hip terminals, 2 way	1.25	1.50	1.00*	1.00*	1.25*
Hip starters	.50	.60	.22	.22	.25
Gable finials	1.25	1.50	1.00	1.00	1.25
Gable starters	.20	.30	.14	.14	.16
End bands	.20	.30	....	....	....
Eave closers	.06	.08	.06	.06	.06

*3-way terminals.

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gauging Plaster	Wood Fiber	White Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	—Plaster Board— ¼x32x36" Weight 1500 lb. Per M Sq. Ft.	⅜x32x36" Weight 1850 lb. Per M Sq. Ft.	Wallboard, ⅜x32 or 48" Lengths 6'-10', 1850 lb. Per M Sq. Ft.
Agatite, Texas (a)	.....	.....	6.00	10.00	10.00	10.50	10.00	.....	19.00	.....	.....	.....	.....
Akron, N. Y. (a)	3.00	4.00	6.00	10.00	10.00	10.00	20.20	7.00@9.00	27.35	21.00	19.375	20.00	30.00@32.00
Blue Rapids, Kans. (a)	2.50	4.00	6.00	10.00	10.00	10.50	10.00	.....	23.15	19.00	19.375	20.00	.....
Douglas, Ariz.	.....	.....	7.00	.....	16.50	.....	19.50	.....	.....	15.50	.....	.....	.....
Ft. Dodge, Iowa (a)	2.50	4.00	6.00	10.00	10.00	10.50	15.45	.....	22.70	20.00	19.375	20.00	30.00
Grand Rapids, Mich.	2.75*	6.00†	6.00†	9.00‡	10.00‖	10.00‖	.....	.....	.....	.....	.....	.....	.....
Gypsum, Ohio (a)	2.75	4.00	6.00	10.00	10.00	10.00	19.25	7.50	26.85	19.00	19.375	20.00	30.00
Hanover, Mont.	.....	.....	.....	11.80	.....	.....	.....	.....	.....	.....	.....	.....	.....
Port Clinton, Ohio	3.00	4.00	6.00	8.00	9.00	9.00	21.00	7.00	30.00	20.00	.....	20.00	30.00
Portland, Colo.	.....	.....	.....	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco, Calif.	.....	.....	9.85	.....	14.40	.....	15.40	.....	.....	.....	.....	.....	.....
Winnipeg, Man.	5.50	5.50	7.00	13.50	15.00	15.00	.....	.....	.....	.....	28.50	.....	35.00

NOTE—Returnable Bags, 10c each; Paper Bags, 1.00 per ton extra (not returnable).
*To 3.25; †to 8.00; ‡to 11.00; ‖to 12; (a) prices are net of bags.

New Machinery and Equipment

Box Car Loader

THE Stephens-Adamson Manufacturing Co., Aurora, Ill., has perfected what it terms the "Saco" type box-car loader, illustrated herewith. The advantages claimed for this loader are: "A high speed belt conveyor with the collapsible feature, which makes it easily movable in and out of the car door. When the frame is telescoped the machine is shortened to the extent that it can be manoeuvred into position for loading into either end of the car according to the placement.

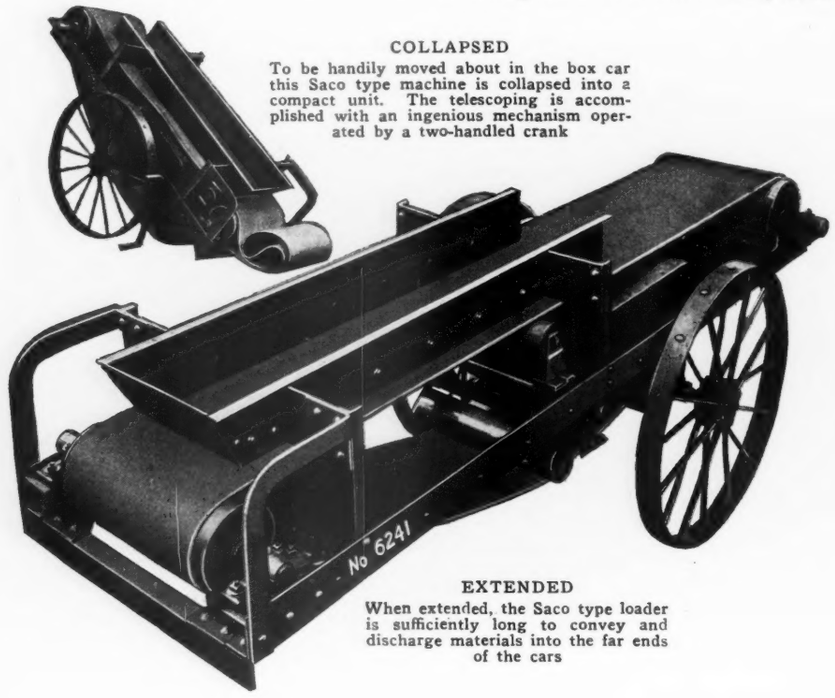
"It is simply necessary to operate a special crank mechanism at the side of the loader to extend the frame to its operating length. A special locking device holds the frame rigidly in place.

"The conveyor is provided with a 5 hp. electric motor which is equipped with switch controls on a panel mounted in a convenient position. Normally the drive gearing is arranged to provide a belt speed of approximately 700 ft. per minute, which has been found to be most suitable for throwing the material into the far ends of the car to secure capacity loading.

"That the material can be loaded directly onto the belt, steel skirt boards are provided which are fitted with special wearing strips to protect the conveyor belt."

The following specifications describe the loader in more detail:

Width of belt—18 in.
Speed, standard—700 ft. per min.
Collapsed centers—5 ft. 8 in.
Extended centers—9 ft.
Drive—5 hp. electric motor, A. C. or D. C. current.
S-A fully enclosed driving mechanism.
Carriers—all-steel ball bearing type.
Belt—rubber covered conveyor belt.
Skirt boards — steel skirt boards, with protecting strip.
Truck—two-wheel all-steel truck.
Extension feature — special collapsible.
Telescopic frame with crank mechanism control and lock.

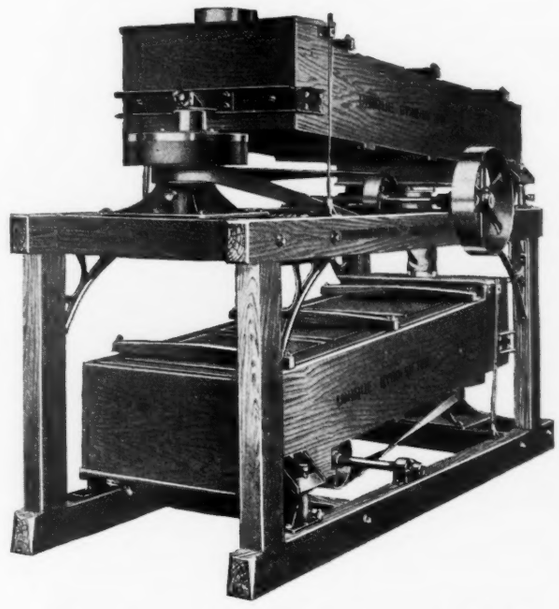


COLLAPSED
To be handily moved about in the box car this Saco type machine is collapsed into a compact unit. The telescoping is accomplished with an ingenious mechanism operated by a two-handled crank

EXTENDED
When extended, the Saco type loader is sufficiently long to convey and discharge materials into the far ends of the cars

The Unique Gyro-Sifter

THE "Unique" gyro-sifter, made by the Robinson Manufacturing Co., Muncy, Penn., is a screen that works by a method somewhat out of the ordinary. The screening motion is neither a bump nor a shake. It is a flat circular or gyratory motion, about the same motion that is found to be so effective in hand screening. Combined with this is a novel method of cleaning the screen fabric and preventing it from blinding. The screen frame is divided into a number of compartments in each of which are rubber balls. These balls are below the screen through which the material is to be sieved and rest on a coarse ridged screen. The effect of the gyratory motion and the ridged screen is to throw the balls up against the surface of the screen fabric and this jars out any grains that are stuck in the meshes of the fabric and keeps the meshes open.



"Unique" gyro-sifter with two screens in series

Can Size Different Kinds of Rock Products

The manufacturers claim that this screen will successfully handle damp or dry materials and that it can be applied to the sizing of many kinds of rock products.

The machine is made with a single screen or in a multiple form. The illustration shows one of the multiple forms with two screens in series so that the material can flow by gravity from one screen to the other, making as many grades of product as may be desired.

The drive of the screen is by a quarter-turn belt from the main shaft of the machine. The throw of the screen is counterbalanced by weights in a large counterbalance wheel, and weights may be added or removed to make the balance correct. The whole driving mechanism is furnished with ball bearings.

The manufacturer states that the machines are built in many different styles and sizes, with either wooden or metal body.

Superior McCully Fine Reduction Gyratory Crusher

The most successful secondary gyratory crusher on the market today

Operating on the hardest ores, trap rock, granite, gravel boulders and limestones.

Has reversible concaves and reversible top shell, increasing the life of concaves 100 per cent.

Reduced angle between head and concaves insuring a more uniform product. Increased discharge area giving a large capacity of product.

Cut cast steel driving gears reducing horsepower to drive.

A POSITIVE OILING SYSTEM flooding eccentric bearing and driving gears with a copious supply of oil at all times.

Send for Bulletin No. 1461

Sizes, Capacities, Horse Power and Weights:

Size of Crusher in Inches	Two Feed Openings Size Each in Inches	CAPACITY PER HOUR IN TONS OF 2000 POUNDS — Size of Discharge Opening in Inches									DRIVING PULLEY		H.P. Required	Weight of Crusher in Lbs.
		¾	⅞	1	1¼	1½	1¾	2	2¼	2½	Size in Inches	R.P.M.		
6	6x40	24	28	32	40	48	.....	.....	.....	.....	36x12½	500	40 50	32000
10	10x52	.....	.....	.....	.....	80	94	107	120	135	36x18½	450	75 100	64000

ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.

News of All the Industry

Incorporations

Silver Creek Lime Co., Dowagiac, Mich., has been incorporated for $3000.

Mundy Corporation has been incorporated under the laws of Delaware for $1,000,000 to quarry stone.

Lutz Stone Co., Oshkosh, Wis., has been incorporated for $150,000 by Robert Lutz, R. W. Lutz, and Gertrude Lutz.

Dayton-Bedford Stone Co. has been incorporated under the laws of Delaware for $650,000. (Corporation Service Co.)

Concrete Products, Inc., Haddam, Conn., has been incorporated for $150,000 by Philip Dickinson and others of Haddam.

State Gravel Co., Tacoma, Wash., has been incorporated for $100,000 by W. R. and H. K. Nichols and Scott Z. Henderson.

Hamburg Ridge Lime Co., Inc., Dover, Delaware, has been incorporated for $100,000 to produce limestone. (Attorneys, Cooper & Cooper, Dover.)

Concrete Products Co. has been incorporated in Grand Junction, Colo., with a capital stock of $100,000, by F. C. Morton, J. A. Post, and H. C. White.

Cambridge Sand and Gravel Co., Boston, Mass., has been incorporated for $500,000. G. Duthie-Strachan, president; Max L. Sand, 128 Chestnut street, Boston, Mass., treasurer.

Alfred Sand and Gravel Corp., Hornell, N. Y., has been incorporated for $300,000 by F. W. Starrett, W. J. Schwiger, W. S. Calhoun. (Attorney, C. L. Earley, Andover.)

Oklahoma Material Co., Enid, Okla., has been incorporated for $25,000 to develop a 160-acre sand deposit. President, A. J. Mahoney; secretary, J. H. Mahoney, Jr.

H. H. McKee & Sons, Inc., New York City, has been incorporated for $200,000 to produce sand, clay, minerals, etc. (Attorney, F. A. Huck, 254 Echo place, Bronx, N. Y.)

Ideal Cement Co., of Colorado has been incorporated in Oklahoma City, Okla., for $10,000. Una Lee Roberts, service agent. 211 State Capitol building, Oklahoma City, Okla.

Benedict Stone Co., Inc., has been incorporated under the laws of Delaware for $1,200,000 to quarry stone, limestone, lime, marble, and granite. (Corporation Trust Co. of America.)

Southern Rock Asphalt Co., Oklahoma City, Okla., has been incorporated for $100,000 by John J. Harden and R. D. Farmer of Oklahoma City, and William Fleming, Jr., Pittsburgh, Penn.

Tromford Concrete Products Corporation, Brooklyn, N. Y., has been incorporated by R. Trombino and C. E. Sanford for 200 shares preferred stock, $100 each; 500 common, no par. (Attorney, P. Crichton, 41 East 42nd street, New York City.)

Boyne City Portland Cement Co., Boyne City, Mich., has filed incorporation papers and is forming an organization with a capital of $2,000,000. Temporary officers include: W. H. White, president; L. W. Seigel, secretary-treasurer. Directors: Joseph Dunn and W. M. Martin of Boyne City; William J. Pearson, Boyne Falls; and John Yuill of Vanderbilt.

Sand and Gravel

Standard Gravel Co., Murfreesboro, Ark., has resumed operations at its plant at Antoine, Ark., which was shut down for several days to make additions in machinery.

Sherman Schroeder, Napoleon, Ohio, has purchased the interest of his partner, Albert F. Panning, in the sand and gravel business, and will hereafter continue the business alone.

Cape Sand Co., Cape Girardeau, Mo., has plans for a new sand and gravel plant, with hoisting, conveying, loading and other machinery, estimated to cost $25,000. Linder Diemund is president.

Riverside Sand and Gravel Co., Kelso, Wash., has moved its plant and equipment from Rock Point to a point opposite the Kelso Floral Co. on the old Collins bar in the Cowlitz. Ford Purdy has taken an interest in the gravel company with O. W. Klang and they are getting their plant in shape to produce sand and gravel for Kelso and vicinity.

Midland Sand and Gravel Co., Ennis, Tex., has recently opened a gravel pit east of Ennis. The pit is located across the levee, north of the road, between the Trinity river and cut-off bridges. The lease covers between 100 and 200 acres of a gravel bed, the supply of gravel of which is said to be almost inexhaustible. The Texas-Midland railroad has built a track from its main line to the pit.

Quarries

McLeod Construction Co., Tampa, Fla., is having a complete road base rock crushing plant built by the Maddox Foundry and Machine Co., Archer, Fla.

H. G. Hutchings, 112 Market street East, Winnipeg, Manitoba, Canada, will rebuild an electrically operated stone crushing plant at Bird's Hill, Manitoba.

Monmouth Stone Co., Gladstone, Ill., was sold recently, it is reported, to Norville Arnold of Galesburg representing 34 bondholders, who will continue the operation of the plant. The sale price was $160,000, it is said.

Lime

Summit Lime Co., Los Angeles, Calif., has leased its plant at Tehachapi to the Union Lime Co., 3220 San Fernando Road.

Moore Lime Co., Durbin, Ohio, according to reports, had its plant practically destroyed by fire recently at an estimated loss of approximately $25,000.

Burton K. Harris Lime Co., Limerock, R. I., had its plant partially destroyed by fire a few weeks ago, with a loss estimated at $50,000. It is planned to rebuild.

Henry Cowell Lime and Cement Co., San Francisco, Calif., and its subsidiary, the **San Benito Lime Co.**, Hollister, Calif., owners of the quarry and kiln in the Cienega section, are preparing to reopen for operations. Efforts are being made by company officials to have San Benito county construct a road between the Cienega and Tres Pinos to permit the company to haul materials directly into Hollister.

Cement

Superior Portland Cement Co., Seattle, Wash., has increased its capital from $2,000,000 to $3,000,000.

Glens Falls Portland Cement Co., Glens Falls, N. Y., is reported to be building six warehouses at its plant at a total cost of about $200,000.

American Portland Cement Co., Los Angeles, Calif., has moved into larger offices in the Commercial Exchange building at Ninth and Olive streets.

Halburton Cement Co., Mexia, Tex., is said to have secured a location on the Wasson lease in the new oil field and will immediately set up a plant for the Halburton cement process.

Marquette Cement Manufacturing Co., Chicago, Ill., held a salesmen's get-together meeting and a banquet at the Hotel Idan-Ha recently at Cape Girardeau, Mo. Among those attending: R. B. Dickerson, vice-president and general manager; Mr. Bullard, another vice-president; Paul R. Rice, general sales manager, of Chicago; and F. L. Jaeger, southern sales manager, of Memphis, Tenn.

International Cement Corp., 342 Madison avenue, New York City., for the quarter ended September 30 reports, it is stated, a net income of $921,426 after charges and Federal tax, equal after preferred dividends to $2.36 a share on 364,167 shares of common, against $678,291 or $1.76 a share in the preceding quarter and $755,623 or $2 a share in the third quarter of 1923. Nine months ended September, net income, $2,041,729, equal after preferred dividends to $5.24 a share on common, against $1,852,543, or $4.87 a share in the same period of 1923.

Cement Products

Z. B. Hayslin, Jacksonville, Fla., has a site and is said to be contemplating building a modern tile and concrete factory.

Massey Concrete Products Co., Chicago, Ill., has secured 22 acres at Belleville, Ont., where it will erect a plant for the manufacture of cement products, sewer pipe, etc.

La Jolla Cement Tile Works, La Jolla, Calif., has been purchased by C. C. Ostander, owner of the Waterproof Cement Tile Works, San Diego, Calif. New machinery will be installed to enlarge the output of the plant.

American Cement Paint Co., Rossville, Tenn., will proceed with the erection of the first unit of a new plant at Chattanooga, Tenn., to be one-story, 50x175 ft., estimated to cost $65,000. Other units will be built later. The plant at South Rossville will be moved to the new location, and additional machinery installed. W. P. D. Moros, president.

Wm. De Lhorbe, Oregon, Ill., manufacturer of septic tank molds, writes Rock Products that his concrete products factory was destroyed by fire recently, and his company is equipping another building and will be ready to furnish septic tank molds ready for shipment soon. The company will not be able to furnish septic tanks in carlot shipments before May 1.

Personals

B. B. Phillips, general manager of Gifford-Wood Co., Hudson, N. Y., severed his connections with that organization December 15.

John Norvig, formerly chief engineer of the New Jersey Zinc Co., has joined the staff of the International Portland Cement Co. in the same capacity.

Ray C. McIlee, manager of the Idaho Phosphate Co., Paris, Idaho, returned recently from Salt Lake where he went on business. He reports conditions to be favorable for the development of phosphate in southeastern Idaho.

Harlowe Hardinge, vice-president of the Hardinge Co. of York, Penn., has just returned from an extended trip throughout the West, where he reports that conditions show increased activity, and offer great encouragement for the new year's business.

William Keyes, formerly master mechanic of the Sibley Quarries, Solvay Process, Detroit, Mich., is leaving this company to join the sales department of the Weldit Acetylene Co., looking after the industrial work in the state of Ohio, specializing on rock and cement industries.

Manufacturers

Link-Belt Co., Chicago, Ill., announces that its St. Louis branch office has recently moved from 705 Olive street to larger and more conveniently located offices at 3638 Olive street.

Coe Manufacturing Co., Painesville, Ohio, announces that it has changed the address of its New York City office from Room 710, 36 West 44th street to Fisk building, 250 West 57th street.

Lakewood Engineering Co., Cleveland, Ohio, announces that distribution of its paving and general construction equipment, in the Philadelphia territory, will be handled after January 1 by J. Jacob Shannon & Co., 1744 Market street.

Foote Bros. Gear and Machine Co., Chicago, Ill., announces that it has recently completed arrangements with the Thrall Electric Co. of Havana, Cuba, for the exclusive representation of IXL gear products and speed reducers in Cuba.

Northwest Engineering Co., Chicago, Ill., manufacturer of gasoline convertible cranes, draglines and shovels, announces the removal of its sales office to the seventeenth floor of the Steger building, 28 E. Jackson Blvd., Chicago.

Sullivan Machinery Co., Chicago, Ill., announces that it will exhibit a new V-type four-cylinder, gasoline-engine-driven portable compressor, type WK-314, at the Good Roads Show at the Coliseum in January, as well as other equipment. Joseph H. Brown, Chicago, district sales manager, will be in charge of the exhibit.

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CONTRACTORS AND ENGINEERS

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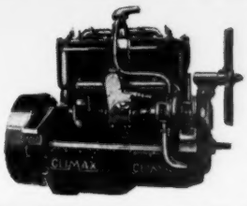
Located at

WOODVILLE, OHIO, U.S.A.

"The Lime Center of the World"

With the new "feather-touch" lever control...



Here is the engine that has helped to make it possible for Northwests to replace so many steam machines where real digging power must be had.

One of Foley Bros.' four Northwests at work on Union Depot

...greater digging power

THE sixty horsepower of the Northwest slow speed engine, far more than can be had on any other machine, combined with the new "feather-touch" lever control, an exclusive Northwest feature, is one of the many reasons why Northwests are replacing steam machines in all classes of digging throughout the country.

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GAS or CONVERTIBLE ELECTRIC
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When writing advertisers, please mention ROCK PRODUCTS

Sand-Lime Brick

John Berg, 117 Wellington street West, Toronto, Canada, is said to be interested in a new company, the Leaside Brick and Sand Co. A sand pit has been purchased at Leaside, Ont., and a sand-lime brick plant will be moved from Hepworth and production will be started in the spring.

Rock Asphalt

Southern Rock Asphalt Co., of Albany and Decatur, Ala., is reported to be planning improvements and extensions to its plant to cost about $300,000.

Fluorspar

Aluminum Fluorspar Co., Mexico, Ky., has acquired the holdings of the Kentucky Fluorspar Co. in Crittenden county.

Hillside Fluor Spar Mines, Chicago, Ill., with operations at Rosiclare, Ill., has purchased from the receiver of the **Matthew Addy Co.**, Cincinnati, Ohio, a fluorspar property known as the Keystone Mine in Crittenden county, Kentucky, about six miles from Marion. The mine, embracing about 60 acres, has not been operated for about 10 years, but is said to contain the highest grade of acid spar. The new management expects to develop the property next spring. The new acquisition will supplement the company's facilities at Rosiclare, Ill., where it has a large mine and a modern fluorspar mill.

Feldspar

Erwin Feldspar Corp., Erwin, Tenn., of which R. W. Lawson is president, has taken over the plant of the Crabtree Feldspar Corp., thus doubling the capacity of its grinding plant, giving the company a monthly capacity of approximately 3000 tons. The company has increased its capital from $150,000 to $800,000.

Potash

Poteau, Okla.—It is reported that a company is being organized here to develop the potash industry recently discovered on 300 acres of land near Spiro, LeFlore county. The mineral, consisting of an eight-foot deposit, was discovered last June in sinking a well. The vein is only 26 feet underground.

Talc

Western Talc and Magnesite Co., East Second street, Los Angeles, Calif., has had plans prepared for the construction of a one-story 25x150-ft. factory at River near First street.

Slate

Northfield, Vt.—The first steps in the actual revival of the slate industry here will be taken next summer, W. W. Holden of South Northfield announced recently. Two Granville, N. Y., men will open one of the quarries in South Northfield, operated 20 years ago by the Vermont Slate Co. The lease which they have signed calls for the commencement of work on July 1, the report states. Almost half a century has elapsed since the time that the slate industry flourished here.

Phosphate Rock

Southern Phosphate Co., Lakeland, Fla., is having plans prepared for the construction of a new plant. G. B. Massey, president. Randolph-Perkins Co., Engineers, is designing and supervising the work.

Magnesite

H. G. Plagemann has succeeded to the business of Dohrman & Plagemann, manufacturers of "Plastone." The latter company maintains a plant, offices, and yards at 463 East Third street, Los Angeles, Calif.

Sierra Magnesite Co.'s calcining plant, Orange and E streets, Porterville, Calif., has resumed operation following a 30-day shut-down for repairs. The plant at present employs about 35 men, but ordinarily from 85 to 90 are employed, the reduction in the working force being due to lessening of demand during winter for magnesite or kellastone stucco products for building.

Trade Literature

American Cement Machine Co., Inc., Keokuk, Iowa. Bulletin 117, an eight-page folder describing and illustrating "Boss" hoists manufactured by this company.

Colorado Iron Works Co., Denver, Colo., has issued Pamphlet 9-D, illustrated, on the company's improved impact screen for either wet or dry screening, describing its use in various plants.

S. G. Taylor Chain Co., Chicago, Ill., has just issued a booklet entitled "Information Concerning Manufacture and Lubrication of Steam Shovel Chain," which the company will send to anyone on request.

W. A. Jones Foundry and Machine Co., Chicago, Ill., Catalog 31 on power transmission machinery, covering shaft hangers, pillow blocks, couplings, collars, belt tighteners, mule stands, bench legs, etc. These are well illustrated, listed, dimensioned, tabulated, etc.

Osgood Co., Marion, Ohio, has just issued a booklet entitled "Fifty-two Years' Experience," which is a brief history of the development of excavating machinery as made by the Osgood Co. and its predecessors. Anyone interested in receiving a copy may have one by writing to the company.

W. A. Jones Foundry and Machine Co., Chicago, Ill., Catalog 32 on sprocket wheels and chain belting, covering a full line of sprocket wheels and chain belting, as well as chain tighteners, elevator boots, buckets, bolts, hand wheels, etc. Illustrations, list prices and complete specifications are included.

Smith Engineering Works, Milwaukee, Wis., has recently issued Bulletin 267-A, describing and illustrating by line drawings, typical quarry plant layouts, ranging in capacity from 10 to 325 yd. an hour. A complete list of equipment required for the plant is given with each drawing together with a free discussion of the advantages and disadvantages of the particular layout.

Waterbury Co., 63 Park Row, New York City. General catalog giving information about wire rope and cordage that the average rope user requires, which is a useful handbook for rope buyers, arranged to give quickly the list prices and other essential data in connection with wire rope and fittings, armored wire rope, fiber-clad wire rope, and cordage.

Pioneer Rubber Mills, San Francisco, Calif. Catalog 19 describing and illustrating the complete line of this company's mechanical rubber goods. The book is attractive looking and is divided into sections as follows: Rubber belting; hose; packing; molded goods and specialties; mats, treads and matting; and brass goods. An index is included for ready reference.

Electric Controller and Manufacturing Co., Cleveland, Ohio. Bulletin 1000-A, a 12-page folder on Type V dinkey ventilated controllers for direct-current motors, and plain reversing and Form H dynamic braking controllers. Bulletin 1030 on Type G controllers for direct-current motors. Both folders contain diagrams and tables of specifications, and halftone illustrations are also shown.

M. H. Detrick Co., Chicago, Ill., has recently issued an attractive 54-page booklet entitled "Detrick Arches," describing and illustrating the arches made by this company, showing their adaptability to all types of boilers and stokers, industrial furnaces and oil stills. Much care and thought have been given to the preparation of this circular which is worthy of a place in the library of those who are interested, and may be had by writing to the company at 140 S. Dearborn street.

Use of Dolomite in the Cyanide Process

CALCINED dolomite has recently been sold as a substitute for lime in cyaniding gold and silver ores, the calcine being cheaper per ton than lime, state Department of the Interior metallurgists in Serial 2648, just issued by the Bureau of Mines.

In cyanide work, lime is used for two purposes: to prevent loss of cyanide; and to cause precipitation of undesirable substances, and flocculation and settling of ore slime. The primary object is to increase the extraction of precious metals.

The results conducted at the rare and precious metals experiments station of the Bureau of Mines, Reno, Nevada, indicate that in regular cyanide practice where cyanide solution is to be used repeatedly for extracing fresh batches of ore, the magnesium oxide content of calcined dolomite can not be used advantageously to neutralize acidity.

Where an excess of calcined dolomite is used to prevent the building up of magnesium salts in solution, the magnesium oxide content takes no part in the reaction. If just enough calcined dolomite is used to neutralize acidity, magnesium salts will build up and eventually form a saturated solution in which the cyanide loss would be high unless an unusual amount of "bleeder" solution is run to waste.

In the cyanide treatment of certain ores calcined dolomite may be substituted for lime with profit. Calcined dolomite is as effective as lime in preventing cyanide loss. Calcined dolomite nearly parallels lime in its precipitation and settling effect and causes no difficulty in filtration of the solution, or in the precipitation of silver and zinc. Calcined dolomite equals lime in the quantity of precious metals recovered.

In treating certain ores by the cyanide process, the recovery of silver with the use of calcined dolomite as an alkaline agent is not equal to that obtained with the use of lime. The use of magnesium oxide content of calcined dolomite would therefore be confined to neutralizing acidity and aiding settlement where the ore is crushed in water for amalgamation prior to cyanide treatment and in cyanide practice where the solution could be discarded or "bled" sufficiently to keep down excess of magnesium salts.

Calcined dolomite should not be purchased as a substitute for lime in the cyanide process without a thorough investigation as to its action on the ore to be treated and its effect on all operations connected with plant practice.

Copies of Serial 2648, by E. S. Leaver, C. W. Davis, and J. A. Woolf, may be obtained from the Department of the Interior, Bureau of Mines, Washington, D. C.